NIH FACT SHEETS ON
Women's Health Research

National Institutes of Health
Office of Research on Women's Health

Table of Contents

Introduction 2

NIH ICO Funding Code Abbreviations 3

Autoimmune Diseases and Women's Health 4

Cancer and Women's Health 6

Cardiovascular Disease and Women's Health 8

Dementia and Women's Health 10

HIV and Women's Health 12

Maternal Morbidity and Mortality 14

Menopause 16

Mental Health and Women's Health 18

Substance Misuse, Substance Use Disorder, and Women's Health 20

Violence Against Women and Trauma 22

Selected Women's Health NIH Activities—FY22 and FY23 24

References 26

Introduction

This collection of **NIH Fact Sheets on Women's Health Research** provides health and disease data on women with relevant discussions of how sex and/or gender differences and female-specific considerations may play a role in shaping the health status of women. The health and disease topics were selected given their alignment with key issues of morbidity and mortality for women.

The fact sheets outline the state of the science for women's health on autoimmune diseases, cancer, cardiovascular disease, dementia, HIV, maternal morbidity and mortality, menopause, mental health, substance use disorder, and violence against women and trauma. Accompanying health- and disease-specific discussions, scientific gaps and opportunities for further study, and current National Institutes of Health (NIH) activities (e.g., active projects, programs, collaborations, and initiatives) are highlighted.

These fact sheets are a product of the NIH Coordinating Committee for Research on Women's Health. The women's health research funding data and figures included were derived in collaboration with the NIH Office of Extramural Research (OER), using draft Fiscal Year 2023 Research, Condition, and Disease Categorization (RCDC) data. Taken together, these fact sheets characterize the women's health research landscape and identify opportunities for interdisciplinary and multifaceted research strategies to address women's health research topics.

NIH ICO Funding Code Abbreviations

Funding data for the fact sheets are displayed using NIH institute, center, and office (ICO) abbreviations. The abbreviations within the fact sheet are detailed below:

FIC	NIH Fogarty International Center
NCATS	National Center for Advancing Translational Sciences
NCCIH	National Center for Complementary and Integrative Health (formally NCCAM)
NCI	National Cancer Institute
NEI	National Eye Institute
NHGRI	National Human Genome Research Institute
NHLBI	National Heart, Lung, and Blood Institute
NIA	National Institute on Aging
NIAAA	National Institute on Alcohol Abuse and Alcoholism
NIAID	National Institute of Allergy and Infectious Diseases
NIAMS	National Institute of Arthritis and Musculoskeletal and Skin Diseases
NIBIB	National Institute of Biomedical Imaging and Bioengineering
NICHD	*Eunice Kennedy Shriver* National Institute of Child Health and Human Development
NIDA	National Institute on Drug Abuse
NIDCD	National Institute on Deafness and Other Communication Disorders
NIDCR	National Institute of Dental and Craniofacial Research
NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases
NIEHS	National Institute of Environmental Health Sciences
NIGMS	National Institute of General Medical Sciences
NIMH	National Institute of Mental Health
NIMHD	National Institute on Minority Health and Health Disparities
NINDS	National Institute on Neurological Disorders and Stroke
NINR	National Institute of Nursing Research
NLM	National Library of Medicine
OADR-ORWH	Office of Autoimmune Disease Research in the Office of Research on Women's Health
OAR	Office of AIDS Research
OBSSR	Office of Behavioral and Social Sciences Research
OD	Office of the Director, NIH
ODP	Office of Disease Prevention
ORWH	Office of Research on Women's Health

01.

Autoimmune Diseases and Women's Health

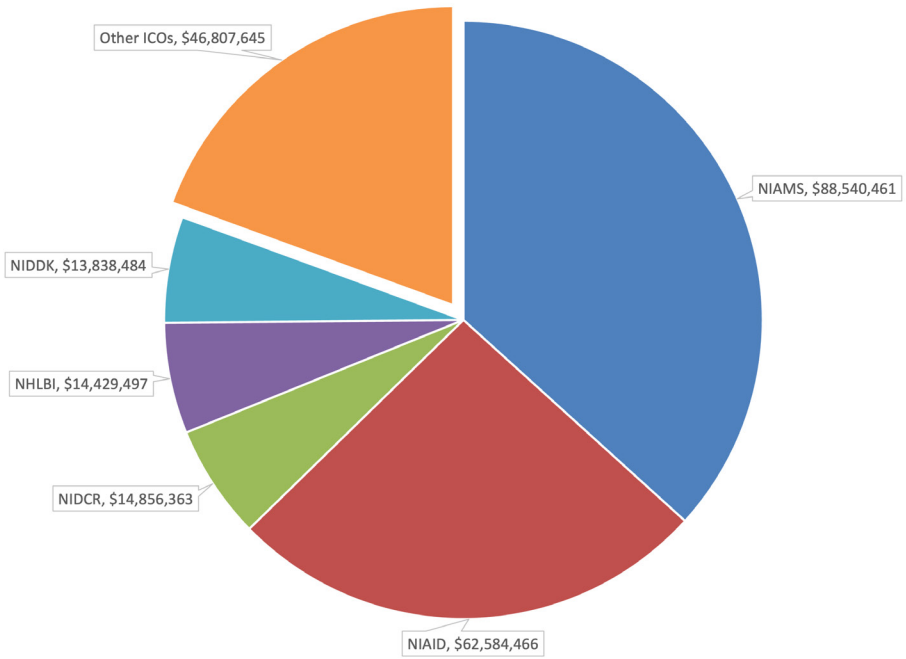
Background: Autoimmune diseases are characterized by the immune system erroneously attacking self-antigens, cells, and/or organs. Common autoimmune diseases include rheumatoid arthritis (RA), psoriasis, systemic lupus erythematosus (SLE), multiple sclerosis, inflammatory bowel disease, and type 1 diabetes.

- Autoimmune diseases encompass an estimated 80–150 conditions and affect approximately 5–8% of the population, an estimated 25–31 million Americans.[1,2,3]
- Autoimmune diseases are the third most common category of diseases in the U.S., after cancer and cardiovascular disease.
- Of the patients diagnosed with autoimmune disease, 80% are women.[1,2,4]
- Prolonged latency periods challenge efforts to identify potential exposures or other etiologies that contribute to disease pathogenesis.[5,6]
- Large population-based cohorts have shown an increasing prevalence of autoimmune diseases over time.[7]

Specific considerations relevant to women's health: Many autoimmune diseases are more prevalent in women; however, the exact cause of this increased prevalence is not fully understood. Several female-specific factors are thought to contribute to the increased prevalence of autoimmune disorders among women. Hormonal and physiological changes, such as the onset of puberty, pregnancy, and menopause, can increase the risk and/or severity of systemic autoimmune conditions.[8,9] Pregnancy represents a unique immunologic state in which tolerance of the fetus must be balanced with preservation of the maternal immune system.[10] During pregnancy, autoimmune disease may wax or wane—for example, RA improves substantially in most patients, whereas SLE is associated with several complications of pregnancy including preeclampsia.[11] Sex differences in immune cell responses leading to differences in immune biology in women may contribute to the higher rates of autoimmune disease in

women.[2,12] In female XX mammalian cells, the Xist long noncoding RNA randomly inactivates one of the X chromosomes, where a significant number of immune-related genes are located.[13] Escape from inactivation leads to mosaicism of the female X-chromosome resulting in significant sex differences in the immune system.[14,15] Environmental and occupational exposures (e.g., smoking, sunlight, contact with chemicals) vary by gender and may drive or accentuate sex differences through changes in hormonal or epigenetic effects.[1] Exposure to vicarious racism may result in heightened disease activity and contribute to racial disparities in SLE.[16]

FY23 Women's Health Funding: Autoimmune Disease



The women's health funding figures included in these Fact Sheets were derived with assistance from the Office of Extramural Research using draft RCDC data.

Scientific gaps and opportunities: In 2022, a National Academies of Sciences, Engineering, and Medicine report identified specific research gaps across and within autoimmune diseases that include diagnostics, therapeutics, and outcomes.[2] The heterogeneity across and within autoimmune diseases continues to challenge surveillance efforts and hampers our understanding of disease-specific pathogenic mechanisms. Further investigation of factors that contribute to autoimmunity, such as etiologic factors (including hormones, genetic factors, environmental factors, and the microbiome) require the use of a matrixed approach so that complex interactions can be studied fully. Interventions to reduce disparities in access to care and therapeutic options for autoimmune diseases are also needed.

Current NIH activities: Currently, multiple NIH institutes, centers, and offices (ICOs) support autoimmune research, in alignment with their individual mission areas, which has led to significant advances in autoimmune disease research across multiple disease areas. NIH spending across autoimmune disease and women's health totaled $241 million in Fiscal Year (FY) 2023. The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), National Institute of Allergy and Infectious Diseases (NIAID), and National Institute of Dental and Craniofacial Research supported the largest proportions of women's health funding in autoimmune diseases. NIAID supports the Autoimmunity Centers of Excellence (ACE) to encourage and enable collaborative research to identify improvements in treatments for autoimmune diseases, evaluate the safety and efficacy of treatment strategies for autoimmune diseases, and explore the immune mechanisms underlying the agents evaluated in ACE clinical trials. NIH's recently established Office of Autoimmune Disease Research (OADR) in the Office of Research on Women's Health (ORWH) is focused on identifying emerging areas of innovation and fostering collaboration across NIH ICOs to support high-priority autoimmune disease research. In developing an NIH-wide Strategic Plan for Autoimmune Disease Research, OADR-ORWH will collaborate across ICOs to identify opportunities for synergistic innovation, focused on areas of autoimmune disease research, that will benefit from multi-ICO partnerships and opportunities to catalyze cross-cutting research.

In FY23, OADR-ORWH supported a total of 41 awards across 12 individual ICOs. These awards included 15 extramural co-funding awards, 3 R56 bridge funding awards, 2 Accelerating Medicines Partnership® Autoimmune and Immune-Mediated Diseases (AMP® AIM) awards, 10 intramural co-funding awards, 5 intramural scientific fellowships, and 6 EXposome in Autoimmune Disease Collaborating Teams PLANning (EXACT-PLAN) awards. The EXACT-PLAN program (NOT-OD-23-112) was developed in partnership with NIAMS, the National Institute of Environmental Health Sciences, ORWH, and other ICO collaborators and supports the design, development, and implementation of a future national, interdisciplinary, collaborative, team science research network that will advance the study of the exposome in autoimmune disease.

02.

Cancer and Women's Health

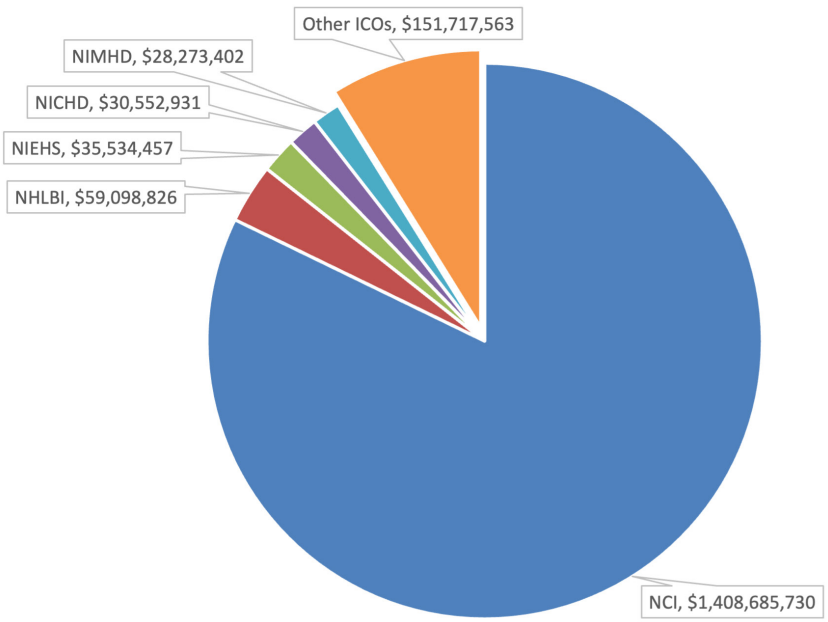
Background: Cancer develops when cells in the body grow uncontrollably and become capable of spreading to other sites within the body. More than 1.6 million new cancer cases and 600,000 cancer deaths are reported yearly in the U.S.[17]

- A lifetime cancer diagnosis is more common among men than women (42% vs. 40%); higher cancer incidence is seen in men across disease sites, except thyroid and gallbladder.[18,19]
- Breast cancer is the most common malignancy among women; lung cancer is the most common cause of cancer death among women; and breast, lung, and colorectal cancers account for over half of all new cancer diagnoses among women.[18]
- More than 110,000 women per year are diagnosed with a gynecologic cancer, the most common of which are cancers of the uterus, and the most lethal of which is ovarian cancer.[18]
- Recent declines in incidence and mortality have been larger in men compared to women.[18]

Specific considerations relevant to women's health: Sex differences in molecular and genomic alterations have been described across cancer disease sites in specific genes, including actionable mutations such as mismatch repair (*MMR*) genes, and mutation signatures.[20,21] Gonadal steroid hormones alter cancer risk and outcomes, and hormonal modulation is a common component of cancer therapy.[22] Although the influence of circulating estrogen, progesterone, and androgens is primarily implicated in cancers of reproductive organs, these hormones influence tumor vasculature, stroma, and other aspects of the tumor microenvironment.[23,24] Total body water, lipid composition, and metabolism influence the pharmacodynamic and pharmacokinetics of anticancer agents, potentially altering efficacy and adverse events, which have been demonstrated to be 34% more likely among women compared to men.[25,26] Distinct sex-specific immune features across multiple cancer types as well as differences in response and adverse events with immune-oncology treatments have been demonstrated.[25,27] Significant diagnostic delays for women have been demonstrated in non-sex-specific disease sites.[28] Breast, endometrial, and cervical cancer are three of the five disease

sites with the largest racial disparities in mortality, suggesting overlapping influences of multiple social factors in outcomes for female-specific cancers. As a result of an aging population, obesity epidemic, and decreasing rates of hysterectomy for benign disease, the incidence of endometrial cancer has risen dramatically.[29] Cancers of the uterine corpus are the only cancer disease site for which survival has decreased over the past 4 decades.[30]

FY23 Women's Health Funding: Cancer



The women's health funding figures included in these Fact Sheets were derived with assistance from the Office of Extramural Research using draft RCDC data.

Scientific gaps and opportunities: Lung cancer diagnoses have been rising in women, while dropping in men. In fact, when adjusted for smoking, women are more likely to develop lung cancer; although men continue to be more likely to smoke.[31] Specific factors have limited improved outcomes in gynecologic cancers. Federal cancer registry datasets do not adjust for hysterectomy, limiting estimates of the population at risk for gynecologic cancers. Despite the availability of population-wide screening since the 1950s and a human papillomavirus (HPV) vaccination since 2006, 13,820 patients are expected to be diagnosed with cervical cancer in 2024.[18] Over half of those patients diagnosed will have never been screened. Furthermore, one-quarter of patients with an abnormal cervical cancer screening test do not receive adequate, timely follow-up.[32]

Current NIH activities: NIH spending for women's health categorized as cancer research totaled $1.7 billion in Fiscal Year 2023. The National Cancer Institute (NCI) supported the largest amount of research categorized as women's health and cancer, followed by the National Heart, Lung, and Blood Institute and the National Institute of Environmental Health Sciences. NCI supports research across the cancer continuum, from basic and translational research to clinical and population science studies on all types of cancer, including cancers that are female specific or primarily affecting women. A cornerstone of NCI's translational research program are the Specialized Programs of Research Excellence (SPORE) awards that support the translation of novel scientific discoveries into clinical testing, including early-phase clinical trials. NCI currently supports seven breast cancer, six ovarian cancer, one endometrial cancer, and one cervical cancer SPORE(s). As part of NCI's National Clinical Trials Network, monthly steering committee meetings address the design, prioritization, and evaluation of concepts for Phase II and III clinical trials in adult gynecologic and breast cancers. Women, however, are underenrolled in U.S. cancer clinical trials compared to men (42.9% of participants in oncology clinical trials between 2000 and 2020 despite having 46.5% of the burden).[33] NCI hosted an endometrial cancer clinical trials planning meeting in 2024. Multiple NCI activities support improved implementation and efficacy of cervical cancer screening and prevention. The Last Mile Initiative is a public–private partnership that aims to validate self-sampling-based HPV testing. As part of the Initiative, NCI launched a nationwide, multicenter screening trial, Self-sampling for HPV testing to Improve cervical cancer Prevention (SHIP).

03.

Cardiovascular Disease and Women's Health

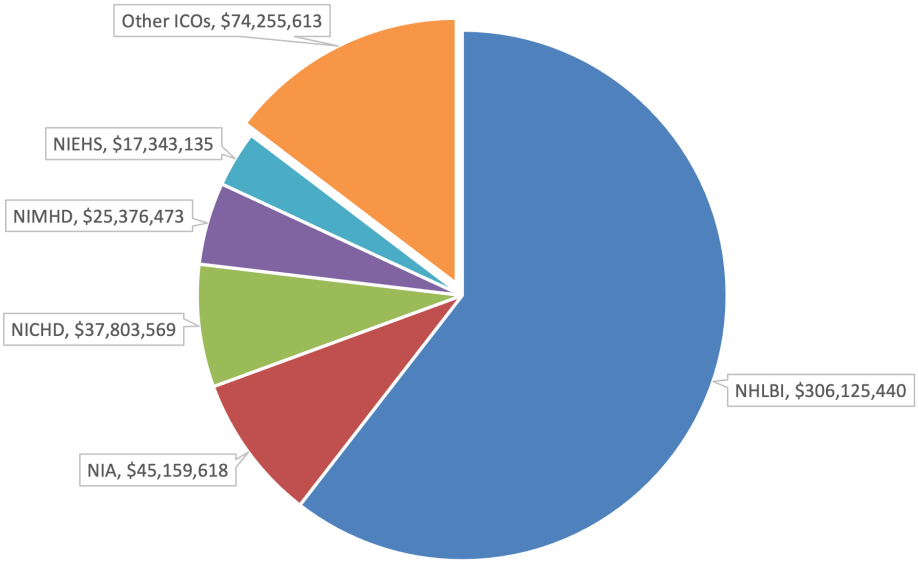
Background: Cardiovascular disease (CVD) is a leading cause of mortality and morbidity in the U.S.[34] CVD mortality rates declined in both men and women between 2000 and 2010, but decreased at a slower pace for women of reproductive age than for other groups.[35,36] Since 2010, a trend of increasing numbers of CVD deaths in both men and women has raised concerns.[37] Disparities in cardiovascular risk indices, prevalence, and mortality by sex, race, ethnicity, education level, socioeconomic status, and geographic location are pervasive.[36]

- Heart disease is the leading cause of death for women in the U.S.
- More than 60 million women (45%) in the U.S. are living with CVD including hypertension.
- Hypertension is often underdiagnosed in women; only 23% of women with high blood pressure have their condition well controlled.[38]
- The symptoms of myocardial infarction are often reported as "atypical" in women—that is, rather than crushing chest pain, symptoms more frequently include back pressure, dizziness, or nausea.

Specific considerations relevant to women's health: Unique sex-specific factors influence risk, diagnosis, and progression of CVD among women. Women are more likely to have medical conditions such as anemia that are associated with increased risk of CVD. Even when adjusted for body size, women have smaller coronary artery diameters, which has been postulated to influence increased morbidity and mortality in female

patients undergoing coronary artery bypass graft and percutaneous coronary intervention.[39] Protective effects of estrogen on the vascular system include vasodilation, by activating the transcription of Enos, regulation of remodeling of the extracellular matrix, and promotion of revascularization following ischemic injury.[40] Cardiovascular conditions, including hypertensive disorders of pregnancy (HDP) and peripartum cardiomyopathy (PPCM), are leading causes of pregnancy-related deaths.[41] Treatment of mild chronic hypertension has been demonstrated to improve pregnancy outcomes without negative effects.[42] The CVD risk associated with HDP persists beyond the pregnancy period. Women with HDP have a 3.7-fold increase in the risk of chronic hypertension, a 4.2-fold increase in the risk of heart failure, an 81% increase in the risk of stroke, and double the risk of atrial arrhythmias, coronary heart disease, and cardiomyopathy when compared to women without HDP.[43,44] Social and cultural factors such as diet, physical safety, exposure to air pollution, and accessibility of physical exercise also influence the lifetime cardiovascular health of women.[45,46] Racial disparities are pronounced for Black women, for whom worse CVD outcomes have been associated with a higher burden of modifiable risk factors and clinical comorbidities.[47]

FY23 Women's Health Funding: Cardiovascular Disease



The women's health funding figures included in these Fact Sheets were derived with assistance from the Office of Extramural Research using draft RCDC data.

Scientific gaps and opportunities: Although women have a lower prevalence of CVD than men, they have worse prognoses after experiencing an acute cardiovascular event. Research about the underlying pathophysiology is limited. Certain cardiovascular conditions, such as myocardial infarction with non-obstructive coronary arteries (MINOCA), ischemia and no obstructive coronary arteries (INOCA), heart failure with preserved ejection fraction (HfpEF), and Takotsubo cardiomyopathy disproportionately affect women. Additional research that considers sex and gender differences in CVD risk, diagnosis, treatment, and outcomes is warranted. There are also knowledge gaps on the role of reproductive health conditions, including polycystic ovary syndrome, and factors such as early age of menarche, use of contraceptives, and early onset of menopause in the development of CVD in women across the lifespan.[48] Effective interventions to prevent cardiovascular complications during and after pregnancy and subsequent CVD should be identified. Long-term analyses of the Women's Health Initiative (WHI) suggest that the risk-to-benefit ratio of menopausal hormone therapy (MHT) in preventing cardiovascular disease differs based on the age at which MHT is prescribed, requiring a more nuanced understanding of optimal formulations, doses, and treatment duration.[49] Opportunities exist to interrogate and address the intersections of CVD, mental health, and alcohol and substance use in women across the life course.

Current NIH activities: NIH spending for women's health characterized as CVD research totaled $506 million in Fiscal Year (FY) 2023. The National Heart, Lung, and Blood Institute (NHLBI), National Institute on Aging (NIA), and *Eunice Kennedy Shriver* National Institute of Child Health and Human Development supported the largest amounts of women's health and CVD funding. NHLBI, with co-funding from the National Institute on Minority Health and Health Disparities, National Institute of Diabetes and Digestive and Kidney Diseases, Office of Disease Prevention, Office of Behavioral and Social Sciences Research, and Office of Research on Women's Health, launched the Early Intervention to Promote Cardiovascular Health of Mothers and Children (ENRICH) program in FY22. This multisite clinical trial will test the effectiveness of an implementation-ready intervention delivered within the context of a home visiting program in enhancing cardiovascular health in the maternal–child dyad. NHLBI's REBIRTH trial is evaluating the impact of bromocriptine therapy on myocardial recovery and clinical outcomes in women diagnosed with PPCM. Current observational studies after pregnancy include the CHAP Maternal Follow-up Study, which is assessing whether antihypertensive therapy during pregnancy for mild chronic hypertension reduces the development of subsequent CVD. Investigation into the risks of cardiotoxicity resulting from breast cancer therapies are ongoing. CVD outcomes continue to be assessed in older women in NHLBI's ongoing WHI and NIA's Study of Women's Health Across the Nation (SWAN).

04.

Dementia and Women's Health

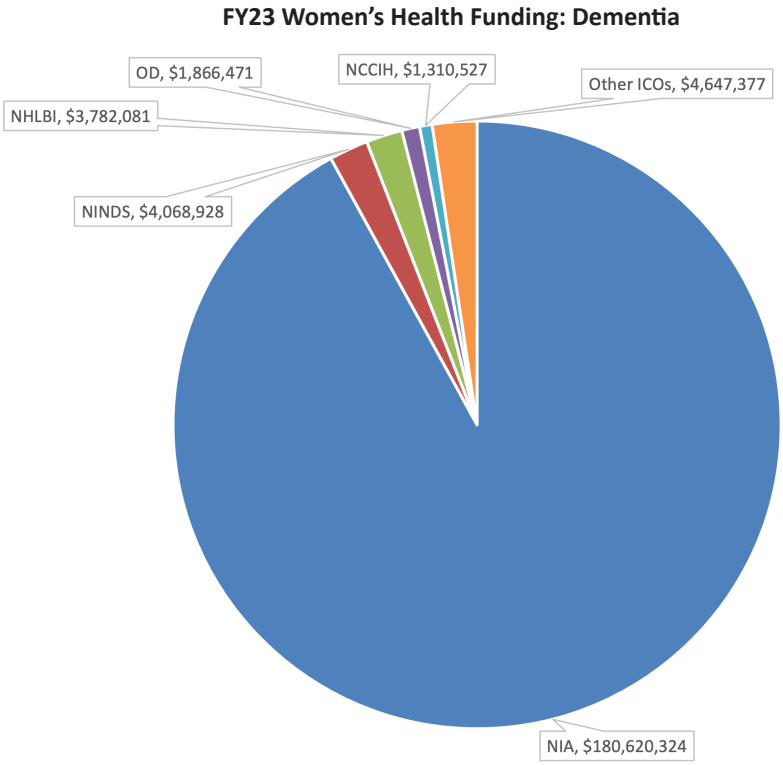
Background: Dementia is the loss of cognitive functioning—thinking, remembering, and reasoning—to such an extent that it interferes with a person's daily life and activities and occurs mainly in people aged 65 and older.[50] Alzheimer's disease (AD) is the most common type of dementia.

- AD is the fifth leading cause of death for women in the U.S.[51]
- Over two-thirds of the 6 million people aged 65 and older with AD are women.[52]
- One in five women are at risk for AD, compared to 1 in 10 men.[52]
- Approximately two-thirds of caregivers of people with AD and AD Related Dementias (AD/ADRD) are women.[52]

Specific considerations relevant to women's health: The higher lifetime risk of dementia for women is primarily attributable to women having a greater life expectancy compared to men.[53] Several sex-specific factors have been implicated in the risk, progression, and outcomes of AD in women.[53,54] Premenopausal surgical menopause and the resultant abrupt decline in estrogen have been associated with accelerated aging including an increased risk of dementia.[55] Interactions of estrogen with APOE4, the strongest genetic risk factor for AD, are associated with the development of dementia.[54] Recent evidence of the "timing hypothesis" of menopausal hormone replacement suggests that estrogen therapy initiated during the menopausal (as opposed to the postmenopausal) transition may reduce the risk of dementia.[56,57] Social and structural factors also influence dementia risk and outcomes for women. For example, women are more likely than men to live in poverty and experience wage gaps and limited availability of caregiving supports—chronic stressors that increase the susceptibility of the aging brain to cognitive decline and other neuropathologic insults.[53,58]

Scientific gaps and opportunities: Although women are enrolled at equal rates to men in dementia-related clinical trials, their representation remains proportionately low compared to the number of women with a dementia diagnosis. The Alzheimer's Disease Preclinical Efficacy Database (AlzPed) includes sex as a biological variable as one of nine core design elements to promote rigor for preclinical AD research. Sex-disaggregated

efficacy and safety outcomes have been infrequently reported. Needed is additional research on sex differences and female-specific etiologies, prevention, and treatment strategies for AD specific to women, and on the intersection of AD with age-related health conditions, to which older women are vulnerable.[59] A better understanding of how gender, as a social and structural construct, contributes to AD/ADRD risk and outcomes, particularly in sexual and gender minority populations and in different ethnic and racial populations, is needed. Women have significantly different caregiving needs compared to men, and novel approaches to the delivery of AD care also are warranted.



The women's health funding figures included in these Fact Sheets were derived with assistance from the Office of Extramural Research using draft RCDC data.

Current NIH activities: NIH spending for AD/ADRD specific to women's health totaled $196 million in Fiscal Year (FY) 2023. AD/ADRD research activities are primarily led by the National Institute on Aging (NIA), National Institute of Neurological Disorders and Stroke, and National Heart, Lung, and Blood Institute (NHLBI). Women represent 53–60% of participants included in AD-related research, lower than the percentage of women in the underlying dementia population.[59] NIA and NHLBI support the WHI Memory Study (WHIMS), an ancillary study to the WHI Hormone Trials, which is enrolling women aged 65 and older and investigating the effects of menopausal hormone therapy on age-related changes in cognition. Measures of cognitive function have been obtained annually from participants enrolled in the Study of Women's Health Across the Nation (SWAN). As women within the Women's Interagency HIV Study (WIHS) have aged, NIH-supported research is investigating the unique risks of dementia in this population. The Office of Research on Women's Health and NIA have recently co-funded research on sex-specific effects of sex hormones on aging and AD. Since the mid-1980s, 33 Alzheimer's Disease Research Centers have received NIH funding.

05.

HIV and Women's Health

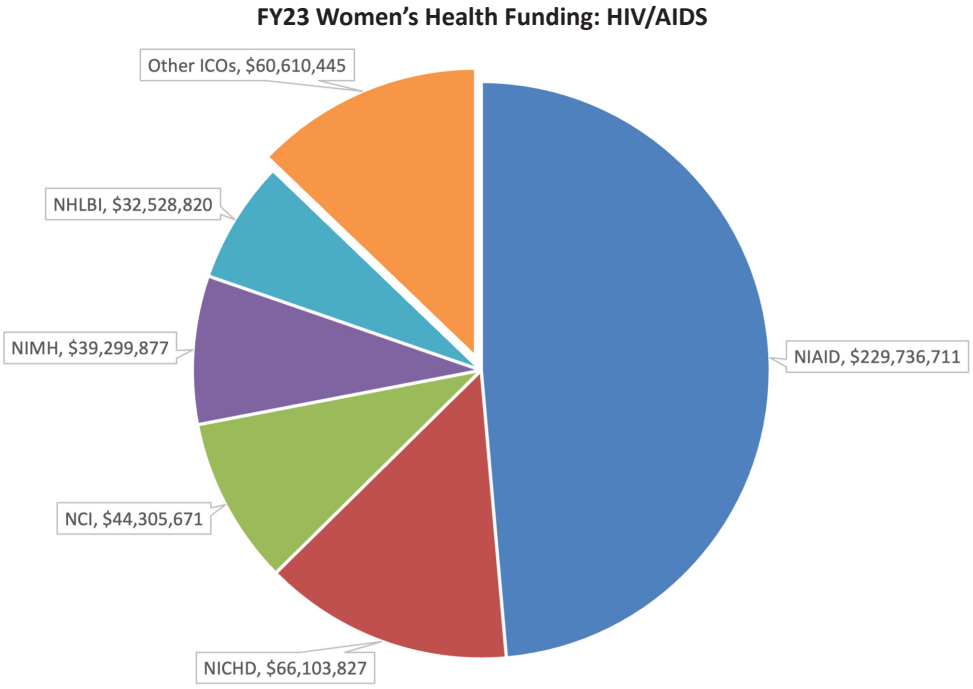
Background: An estimated 39 million people are living with human immunodeficiency virus (HIV) globally.[60] Approximately 1.7 million new HIV diagnoses are reported globally each year, with two-thirds in southern and eastern Africa. In the U.S., an estimated 1.1 million adults are currently living with HIV, with more than 30,000 new HIV diagnoses each year.[61]

- Globally, 54% of people living with HIV are women.
- In 2020, more than 250,000 women in the U.S. were living with HIV and more than 5,000 women with newly acquired HIV.[61]
- An estimated 44% of Black and 26% of Latinx transgender women in the U.S. are living with HIV.[62,63]
- Black women accounted for 54% of new diagnoses among women in the U.S.[61]

Specific considerations relevant to women's health: Women—particularly women from racial and ethnic groups underrepresented in research, transgender women, and young women—remain disproportionately affected by HIV.[64] Biological and social factors affect HIV risk, progression, and outcomes. Sex-specific anatomic vulnerabilities to HIV acquisition are linked to unique characteristics of the female genital tract, the vaginal microbiome, and sex differences in inflammation.[65,66] Significant differences in pretreatment viral loads exist between cisgender men and women, with women having lower HIV viral loads early in infection.[67] Estrogen may suppress HIV transcription, leading to lower HIV expression in premenopausal female patients as compared to postmenopausal female and male affected individuals.[68] Social and structural determinants of health influence vulnerability of women to HIV. Stigma, exclusion from economic opportunities, lack of access to secondary school, and gender-based violence all disproportionately affect women living with HIV. For example, researchers have shown that 36–55% of women with HIV experience intimate partner violence (IPV).[69] Women with a lifetime history of IPV have been found to have a 1.5 times higher incidence of HIV infection compared with women who have not experienced IPV.[70] Perinatal viral transmission is a unique consideration for pregnant and lactating individuals living with HIV. Prevention

of maternal-to-child transmission of HIV with antiretroviral therapy is a seminal example of NIH-supported science impacting public health.[71,72]

Scientific gaps and opportunities: Despite sex and gender influences on HIV pathogenesis, immunology, and disease management, women comprise only 17% of HIV cure-related trial participants.[73] Intentional efforts to increase accrual of women to HIV cure-related clinical trials are warranted. Women living with HIV are aging, and aging women remain at risk for HIV. Approximately 54% of women living with HIV in the U.S. are over age 50, and Centers for Disease Control and Prevention analyses reveal that acquisition HIV is increasing among women aged 55 and older.[74] Women aging with HIV have unique risks for multimorbidity, highlighting a need for research addressing the impact of HIV in women across the lifespan, including those who are postmenopausal. Social and behavioral research to understand and address weathering, social isolation, stigma, elder mistreatment, and loneliness in the context of HIV and aging is also needed.



The women's health funding figures included in these Fact Sheets were derived with assistance from the Office of Extramural Research using draft RCDC data.

Current NIH activities: NIH funding on HIV and women's health totaled $472 million in Fiscal Year 2023. The National Institute of Allergy and Infectious Diseases (NIAID), *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), and the National Cancer Institute supported the largest amounts of HIV and women's health funding. Nineteen NIAID-supported Centers for AIDS Research are located at academic and research institutions throughout the U.S. The Women's Interagency HIV Study (WIHS) was established in 1993 as a multi-center, prospective, observational cohort study of cisgender women living in the U.S. The study was merged in 2019 with the Multicenter AIDS Cohort Study (MACS) under a unified study of men and women, the MACS-WIHS Combined Cohort Study (MACS-WIHS CCS), in which research to define the clinical outcomes for women with HIV across their full lifespan remains a critical focus. In May 2022, NIAID reissued the program Transgender People: Immunity, Prevention, and Treatment of HIV and STIs that supports hypothesis-generating research of transgender people, including women, and will characterize the biological and immunological impacts of gender affirming interventions on HIV susceptibility. In 2023, NIAID and NICHD supported three projects under the American Women: Assessing Risk Epidemiologically (AWARE) program, which aim to better understand HIV prevention, transmission, and early care-cascade points for cisgender, transgender, and gender nonconforming women living in the U.S. In December 2023, NIAID reissued the Next Generation Multipurpose Prevention Technologies (NGM) program, which supports development of new and innovative multipurpose prevention technologies that prevent HIV infection and pregnancy and/or other sexually transmitted infections. The NIH Office of Research on Women's Health and Office of AIDS Research launched the joint HIV and Women Signature Program in February 2023 as an intersectional, equity-informed, data-driven approach to research on HIV and women. Strategies to accomplish programmatic goals include an NIH-wide working group with representation from 19 NIH institutes, centers, and offices, ongoing NIH funding portfolio analyses, information dissemination (website, blog posts), Requests for Information, and workshops.

06.

Maternal Morbidity and Mortality

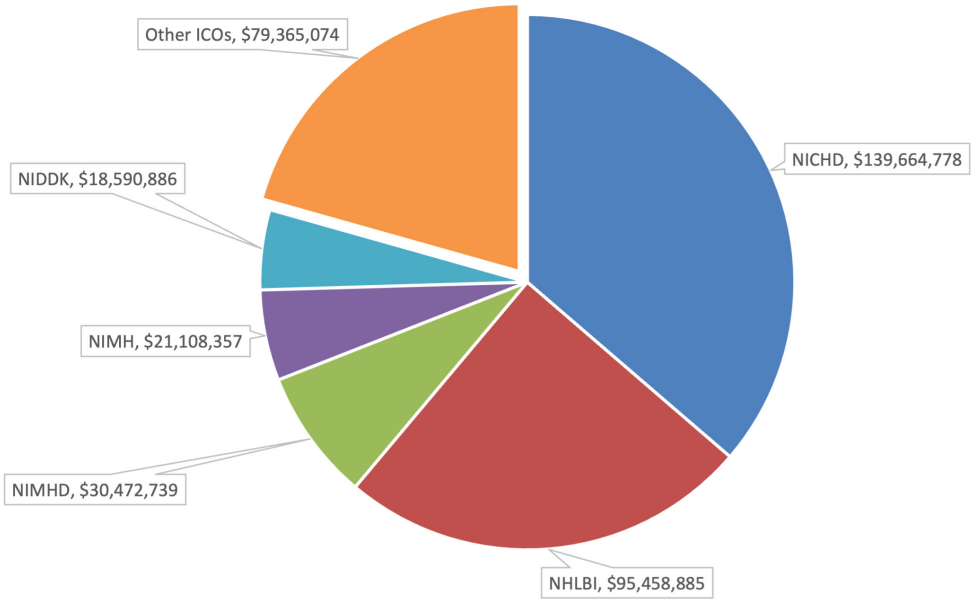
Background: Maternal morbidity and mortality (MMM) refers to any health condition attributed to and/or aggravated by pregnancy and childbirth that has a negative impact on the woman's wellbeing.[75] Maternal mortality is defined as any pregnancy-related death as a death while pregnant or within 1 year of the end of pregnancy from any cause related to or aggravated by the pregnancy.[41] Severe maternal morbidity (SMM) includes unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman's health.[76] Rates of SMM have nearly doubled during the past decade.[77,78]

- In 2021, 1,205 women died in the U.S. as a result of pregnancy or delivery complications,[79] representing a maternal mortality rate of 32.9 deaths per 100,000 live births.
- An estimated 80% of maternal deaths are preventable.[80]
- Each year, more than 60,000 women in the U.S. are affected by SMM.[81,82]
- Among pregnancy-related deaths with information on timing, 22% occurred during pregnancy, 25% occurred on the day of delivery or within 7 days after, and 53% occurred between 7 days to 1 year after pregnancy.[83]

Specific considerations relevant to women's health: The leading underlying causes of pregnancy-related death include mental health conditions (including deaths to suicide and overdose/poisoning related to substance use disorder; 23%), hemorrhage (14%), cardiac and coronary conditions (13%), infection (9%), thrombotic embolism (9%), cardiomyopathy (9%), and hypertensive disorders of pregnancy (7%).[83] For every pregnancy-related death in the U.S., 100 women experience a "near miss" (i.e., SMM).[81] Illnesses and complications occurring before or after the birth hospitalization affect 14–22% of pregnancies in the U.S., and few therapies for these conditions have been studied in pregnancy.[84] Pregnancy can be viewed as a stress test for the health of women later in life because health before pregnancy influences the experience of MMM and because several conditions that occur during pregnancy are associated with the development of chronic conditions after

pregnancy. For example, a diagnosis of preeclampsia is associated with future hypertension and cardiovascular disease; the risk for type 2 diabetes is almost 10 times higher in women with gestational diabetes.[85,86] Structural disparities related to geography exist, with half of rural counties in the U.S. lacking an obstetrician or delivering facility. Further, rural counties with primarily Black or Indigenous residents are experiencing closures of maternity care facilities at a greater rate than primarily White communities.[87] Access to reproductive health care, including access to contraception and abortion services, to optimize maternal health prior, during, and after pregnancy is critical to the long-term health of women and their families.

FY23 Women's Health Funding: Maternal Morbidity and Mortality



The women's health funding figures included in these Fact Sheets were derived with assistance from the Office of Extramural Research using draft RCDC data.

Scientific gaps and opportunities: High MMM in the U.S.[88] is complicated by the multifactorial nature and causes of pregnancy-related illnesses and complications, and the broad potential timing of incidence—whether during pregnancy, at birth, or postpartum. To gain a richer understanding of maternal health, researchers should consider women's interactions with the maternity care system. MMM is characterized by marked racial and ethnic disparities.[81,89] It is crucial to develop a richer understanding of how structural factors, such as racism and bias, manifest within patient engagements with maternity care systems, because they have significant implications for maternal experience. Two-thirds of pregnancy-related deaths occur outside of the time of delivery; development of stronger evidentiary foundations, regarding maternal care services before and after pregnancy, is needed to ensure uninterrupted, safe, and more effective approaches to maternal care and postpartum health.[90]

Current NIH activities:

NIH spending related to maternal health totaled $384 million in Fiscal Year (FY) 2023. The *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), National Heart, Lung, and Blood Institute (NHLBI), and National Institute on Minority Health and Health Disparities (NIMHD) supported the largest amounts of maternal health funding. The NIH Coordinating Committee for Maternal Morbidity and Mortality oversees the Implementing a Maternal health and PRegnancy Outcomes Vision for Everyone (IMPROVE) Initiative and engages NIH-wide expertise on how to mitigate preventable maternal mortality, decrease severe maternal morbidity, and promote health equity. Through this initiative Maternal Health Research Centers of Excellence were established in FY23. NICHD supports the Maternal-Fetal Medicine Units (MFMU) Network to reduce maternal, fetal, and infant morbidity related to preterm birth, fetal growth anomalies, and maternal complications and to provide the rationale for evidence-based, cost-effective obstetric practice. The Early Intervention to Promote Cardiovascular Health of Mothers and Children (ENRICH) program, led by NHLBI, examines the effectiveness of implementation-ready interventions within the context of a home visiting program to enhance cardiovascular health. In 2022, the National Institute of Nursing Research launched Advancing Integrated Models (AIM) of Care to Improve Maternal Health Outcomes among Women Who Experience Persistent Disparities. In 2021, the National Institute of Diabetes and Digestive and Kidney Diseases established the Glycemic Observation and Metabolic Outcomes in Mothers and Offspring (GO MOMS) study to improve gestational diabetes care throughout pregnancy. The Pathways to Prevention (P2P) Program Identifying Risks and Interventions to Optimize Postpartum Health was launched by the Office of Disease Prevention and sponsoring organizations (Office of Research on Women's Health [ORWH], NHLBI, NIMHD, and NICHD) to address the growing maternal health crisis. In June 2023, the National Institute of Allergy and Infectious Diseases and ORWH reissued the Immune Mechanisms at the Maternal-Fetal Interface program that supports research improving the understanding of how the maternal and fetal immune and non-immune cells interact to support normal pregnancy, as well as the contribution of immune dysregulation to adverse pregnancy outcomes. ORWH also supports the Maternal Morbidity & Mortality (MMM) Web Portal, designed to serve as a central hub and resource to view information about the scope of relevant research at NIH, specific funding opportunities, programs, and events.

07.

Menopause

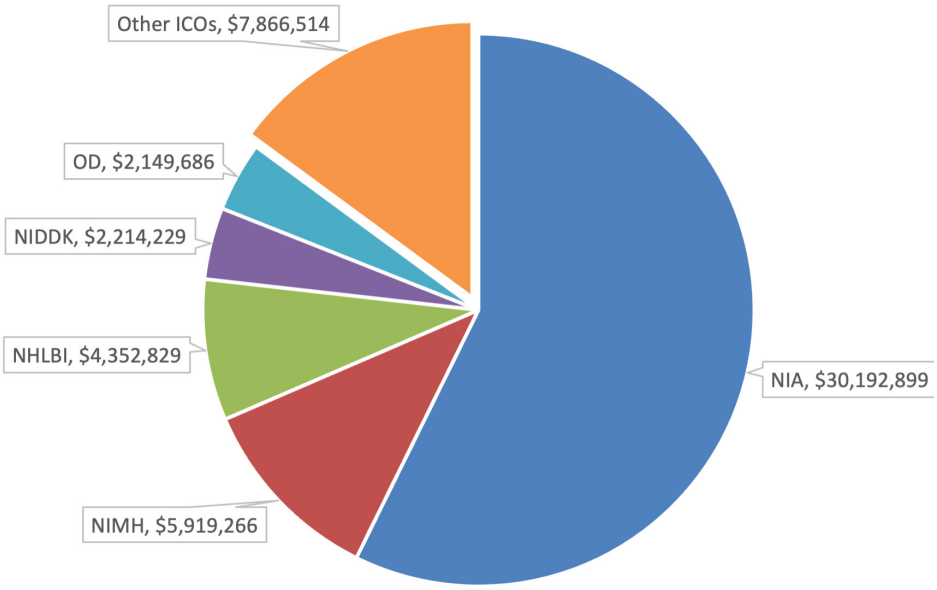
Background: Menopause is defined as the normal, irreversible cessation of menstrual cycling due to an aging-related decline in female reproductive hormones and affects more than 1 million women and other individuals born with ovaries in the U.S. every year, at an average age of 51.[91]

- More than 1 million women in the U.S. experience menopause each year.[49]
- An estimated one in eight women enters surgical menopause before reaching natural menopause.
- Vasomotor symptoms (VMS) are the most commonly experienced symptoms during the menopausal transition (MT) with up to 80% of women affected. Additional menopausal symptoms include sleep disturbances, genitourinary symptoms, joint pain, urinary tract infection, mental health changes, and decreased sexual function.[92,93]
- Only 15% of women receive evidence-based interventions for menopause symptoms.[91]

Specific considerations relevant to women's health: Menopause is a female-specific life course transition and a public health issue because of the degree and range of morbidities associated with menopause as well as the associated influence on the health of women as they age. Surgical menopause has been associated with increased risk of the development of chronic conditions and overall mortality.[55] For patients with VMS, the cost to address this symptom is estimated to range from $248 to $770 per woman per year due to decreased productivity at work.[94,95] Lifestyle factors, environmental exposures, and social determinants of health influence the timing of onset of menopause as well as the severity and duration of menopausal symptoms. Earlier onset and increased severity of symptoms of menopause are reported by Black women; separately, lower educational attainment, lower socioeconomic status, less physical activity, and higher rates of anxiety are associated with increased symptom severity.[96,97] Following menopause, diagnoses of chronic conditions begin to accumulate, making the MT and midlife a critical window for understanding the impact of sex-specific effects on morbidity and multimorbidity.[55] The decline in estrogen associated with menopause contributes to osteoporosis because estrogen is critical to maintaining bone health by preventing bone breakdown.[98] Greater than 50 percent of postmenopausal White women will have an osteoporotic-related fracture in their lifetime.[99] Without treatment, the risk for a second fracture increases significantly.[100] Measures are needed to ensure that proven protocols to treat postmenopausal women who suffer their first fracture are routinely initiated to prevent additional fractures.

Scientific gaps and opportunities: The basic mechanisms underlying the timing of menopause and the development of menopausal symptoms and the effect of sex-specific factors and conditions on menopause are not yet fully understood. Animal model systems are needed because hormone levels stay constant or increase even into older age for most female mammals.[94] The Women's Health Initiative (WHI) was the largest set of randomized, controlled trials that were designed to study whether menopausal hormone therapy (MHT) could prevent the onset of chronic disease (specifically cardiovascular disease [CVD] and breast cancer) in postmenopausal women; investigators also studied osteoporosis. The trials were designed to assess the efficacy of MHT to prevent CVD, not to assess the efficacy or outcomes associated with the use of MHT to reduce menopausal symptoms. The trials were stopped early following the observation that use of conjugated equine estrogen (CEE) plus medroxyprogesterone acetate (MPA) was associated with statistically increased rates of breast cancer and the global index statistic supported risks exceeding benefits,[101] as well as an association with CEE alone and an excess number of strokes.[102] Subsequent, long-term analyses by WHI revealed that the risks associated with MHT and the subsequent development of cancer, stroke, and other chronic diseases differs by type, age at which MHT was prescribed, and various other risk factors.[49,103,104] These data suggest the safety of MHT for many women experiencing symptoms of menopause when prescribed during or shortly after the MT. Evidence regarding the efficacy and safety of new and different formulations (e.g., micronized progesterone), doses, and modes of delivery (e.g., transdermal, or vaginal) of MHT is currently insufficient. The risks and benefits of the long-term use of many osteoporosis drugs remain underexplored. The role and timing of the treatment of symptoms to best prevent the accumulation of chronic conditions and multimorbidity in postmenopausal women remains inadequately understood.

FY23 Women's Health Funding: Menopause



The women's health funding figures included in these Fact Sheets were derived with assistance from the Office of Extramural Research using draft RCDC data.

Current NIH activities: NIH women's health spending on menopause totaled $53 million in Fiscal Year 2023. The National Institute on Aging (NIA), National Institute of Mental Health (NIMH), and National Heart, Lung, and Blood Institute (NHLBI) supported the largest amounts of menopause research. The Office of Research on Women's Health's 7th Annual Vivian W. Pinn Symposium in May 2023 focused on menopause and optimizing midlife health of women. Ongoing work supported by NIA and others includes the Study of Women's Health Across the Nation that helps scientists, health care providers, and patients understand the relationship between women's midlife experiences, such as menopause, and their health and quality of life in later years in an ethnically and racially diverse sample of women. NHLBI's WHI continues to follow enrolled patients. NIA's Menopause Strategies: Finding Lasting Answers for Symptoms and Health trials and Menopausal Vasomotor Symptoms and Brain Aging in Women studies explore treatment of physical symptoms of menopause and the MT's effects on brain health, respectively. The NIMH Behavioral Endocrinology Branch conducts research on the relationship between sex steroids, stress, and mood such as perimenopausal-related depressions. Researchers supported by NIA and NIAMS are leveraging existing databases and newly collected and validated data to determine the best ways to improve bone mineral density and reduce fracture risk in postmenopausal women. The National Library of Medicine's MedlinePlus produces content specific to women's health issues, including menopause.

08.

Mental Health and Women's Health

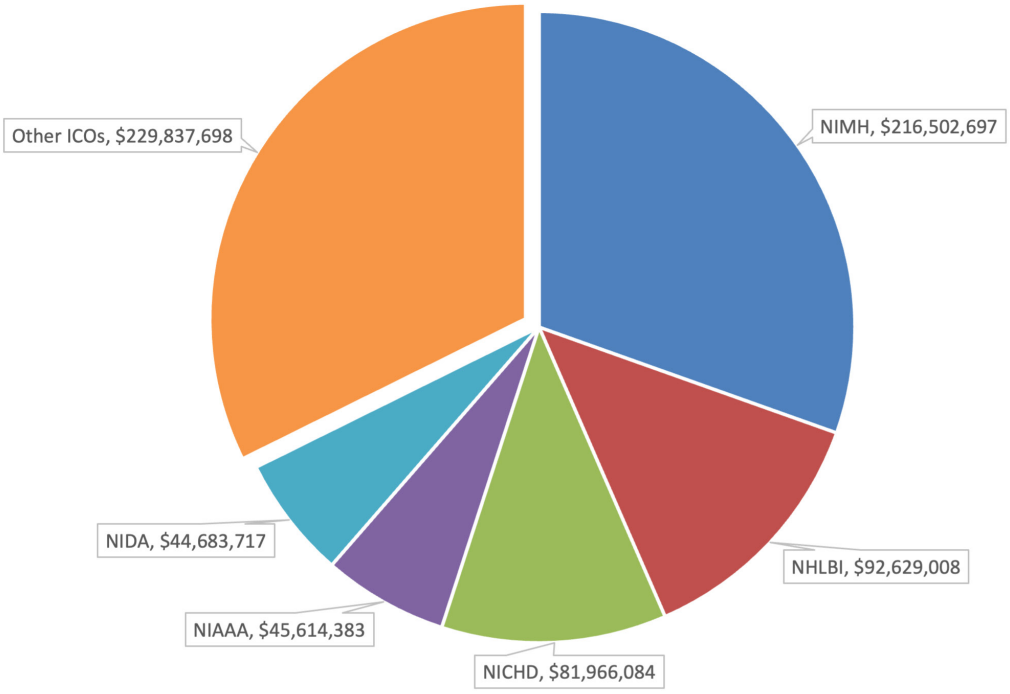
Background: Mental health is an overarching term that describes emotional, psychological, and social well-being.[105]Greater than 20% of adults in the U.S. currently live with a mental health disorder, and estimates suggest that half of the population will be diagnosed with a mental health disorder at some point during their lifetime.[106,107,108]

- The prevalence of any mental health disorder is higher among women (27.2%) than men (18.1%).[106]
- The prevalence of serious mental illness is higher among females (7%) than males (4%).[106]
- Women are more likely than men to experience depression, post-traumatic stress disorder, anxiety, and eating disorders.[109]
- Women may experience psychiatric conditions specific to their reproductive life cycle.[109]
- One in eight women experience perinatal depressive symptoms.[110]

Specific considerations relevant to women's health: Biological factors play a role in the differences in risk, prevalence, and outcomes of mental health disorders in women. Steroid sex hormones have important regulatory functions in relation to neurotransmitter systems—modifying neurotransmitters and thereby influencing cognition and behavioral processes. Estrogens are widely believed to provide neuro-protection against schizophrenic psychoses, a disorder significantly less common in women.[111] Estrogens stimulate neuronal growth and boost neuro-reparative processes such as remyelination, and also play a role in protecting against the effects of ischemia, inflammation, injury, and apoptosis.[112] Changes in symptoms of mental health disorders across the menstrual cycle are commonly reported.[113] Mental health conditions commonly complicate pregnancy and are reported as the underlying cause for approximately 23% of pregnancy-related deaths.[83] Despite recommendations for routine screening, perinatal depression remains underdiagnosed and undertreated.[114] Similarly, the physiologic changes associated with menopause can increase risk for developing depressive symptoms and anxiety, which

may compound symptoms of menopause such as vasomotor symptoms and insomnia.[115] Together, these time periods related to female reproduction—the menstrual cycle, pregnancy, postpartum, and menopause are each often associated with aggravation or emergence of psychiatric symptoms.[112] Further, exposure to psychosocial and environmental stressors arising in the context of gender-based structural disparities and gender socialization, roles, and identity may contribute to the 1.5 and 1.7 times increased prevalence of anxiety or depression, respectively, and may increase the risk of contemplated and attempted suicide in women.[116,117] Although women are more likely to attempt suicide, men are nearly four times more likely to die by suicide.[109] Gender differences in help-seeking may contribute to gender differences in mental health disorders.[118]

FY23 Women's Health Funding: Mental Health



The women's health funding figures included in these Fact Sheets were derived with assistance from the Office of Extramural Research using draft RCDC data.

Scientific gaps and opportunities: To distinguish sex-based differences in mental health conditions, sex-based differences in the brain anatomy, the hypothalamic-pituitary-adrenal axis, immune system, and hormones merit study.[112] Differences in treatment and outcomes may also be related to gender differences, social norms, and power dynamics experienced by women and warrant further investigation.[118] A higher proportion of women than men (25.6% vs. 14.6%) received mental health treatment in the past year, with women more likely to receive medication (21.2% vs. 11.5 %) and counseling (12.1% vs. 7.9%) than men.[119] Implementation and long-term outcomes from the recently Food and Drug Administration–approved agent zuranolone, an oral version of brexanolone, to treat postpartum depression, requires research.

Current NIH activities: NIH spending on women's mental health totaled $711 million in Fiscal Year 2023. The National Institute of Mental Health (NIMH), National Heart, Lung, and Blood Institute, National Institute on Drug Abuse, and *Eunice Kennedy Shriver* National Institute of Child Health and Human Development supported the largest amounts of research on women's mental health. The NIMH Women's Mental Health Program promotes the emotional well-being of women throughout the lifespan, with a particular focus on sex- and gender-related research that explores the pivotal life stages for brain health, such as birth, puberty, pregnancy, reproductive years, menopause, and aging. New NIMH-funded research tracked population-level rates of postpartum depression among new mothers before, during, and after pregnancy. Study findings support the idea that pregnancy and postpartum are risk periods for maternal mental health.

09.

Substance Misuse, Substance Use Disorder, and Women's Health

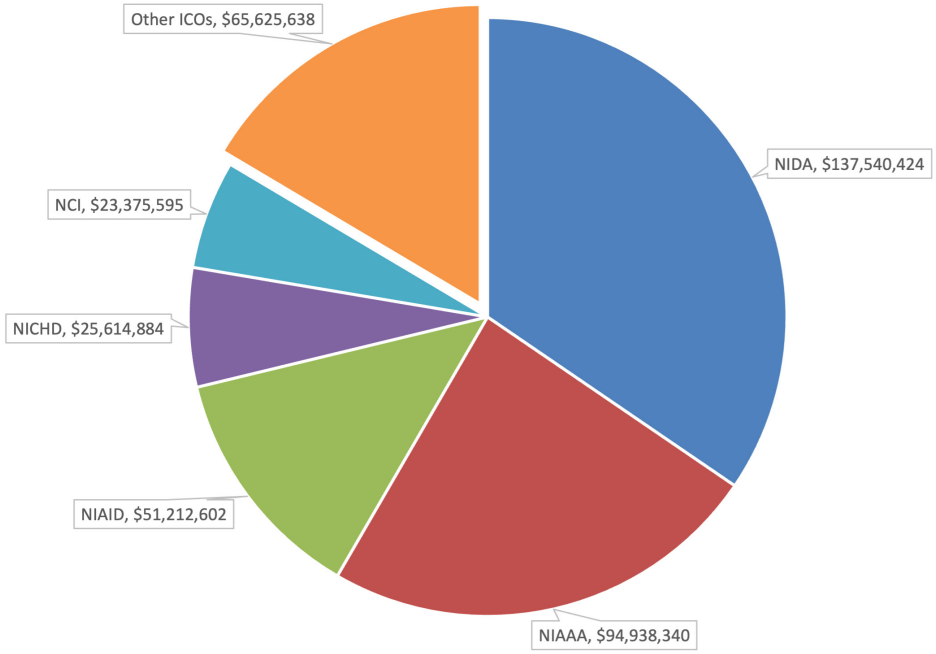
Background: The misuse of alcohol and drug use can progress to substance use disorders (SUDs), which are defined by an impaired ability to stop or control substance use even after experiencing negative consequences.[120] An estimated 17.3% of the population over age 12 reported having an SUD in the past year, with 29.5 million people reporting alcohol use disorder, 27.2 million people reporting a drug use disorder, and 8 million reporting both an alcohol and drug use disorder.[121] SUDs can be mild, moderate, or severe, with addiction as the most severe.[122]

- Nearly half (47.2%) of people reporting lifetime illicit drug use are women.[123]
- Alcohol use, binge drinking, and prescription misuse are more commonly reported by female than male high school students.[124]
- The age-adjusted rate of drug overdose deaths for women increased over 3-fold during the past 3 decades.[125]
- Ten percent of pregnant people reported use of an illicit substance (including cannabis) within the past month, while 11% of pregnant people reported using alcohol.[123]
- The majority of women with an SUD have a co-occurring mental illness that may impact the course of disease.[126]

Specific considerations relevant to women's health: Research on substance misuse and SUDs has been historically focused on men; however, sex and gender influence risk, severity, and outcomes for women.[120,127] Although women who use substances typically initiate use later in life than do men, following initiation of use, women tend to progress more rapidly from use or misuse to SUD more rapidly than men—a

phenomenon known as "telescoping."[128] Among women with an SUD, susceptibility to craving and relapse has been demonstrated as higher than in men.[129,130] Sex differences such as body size and composition influence the effect of substances on an individual.[120] For example, the metabolism of alcohol in females is on average less rapid than in males because of differences in total body water.[127] Hormonal variations across the menstrual cycle may affect addictive behaviors.[131] Women's reproductive health is also impacted by substance use, with an increased likelihood of infertility and early menopause.[120] Women experience stress and trauma more frequently than men, and alcohol can be used to cope with psychological distress.[132] Many women who begin to use injection drugs do so with the influence of a male partner.[133] Women often face unique barriers to accessing treatment. Women are less likely to be screened for substance use during emergency room visits and less likely to be referred to treatment following identification of an SUD.[134] Caregiving responsibilities, availability of childcare, and stigma also contribute to lower SUD treatment utilization among women.[135] As a result of these multiple factors, women tend to enter SUD treatment with more severe medical, behavioral, and psycho-social problems.[136] Pregnancy provides a unique window of opportunity for many women with SUD, because most people reduce or cease using drugs or alcohol during this time.[127] However, availability of treatment during pregnancy is limited, and women frequently lose access to treatment during the postpartum period, placing them at risk of relapse, suicide, and overdose, and compromising their treatment of co-occurring mental health and chronic physical health conditions.[137] SUD and overdose are significant contributors to maternal mortality, especially for pregnant and postpartum women aged 35–44, with the rate of overdose deaths tripling between 2018 and 2021.[138]

FY23 Women's Health Funding: Substance Misuse



The women's health funding figures included in these Fact Sheets were derived with assistance from the Office of Extramural Research using draft RCDC data.

Scientific gaps and opportunities: Research supported by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the National Institute on Drug Abuse (NIDA) has led to the development of effective interventions for treating SUDs and overdose, including medications (such as those for opioid use disorder or tobacco dependence), behavioral interventions, and digital therapeutics. Adoption and implementation of evidence-based practices in SUD treatment have been slow despite evidence of efficacy in overdose prevention and reduction in communicable disease (e.g., HIV transmission).[139] Women have remained underrepresented in modern addiction treatment trials, and an improved understanding of the unique pharmacodynamics of opioid agonist therapies is needed.[140] Specifically, the distribution of substances in the placenta and breast milk remains underexplored. Interventions to reduce the incidence of neonatal abstinence syndrome and fetal alcohol spectrum disorders are needed. Novel and integrated care delivery models could overcome sex and gender–specific barriers to substance use treatment including stigma, and in particular stigma faced by women with substance use, substance misuse, or SUD during pregnancy and in motherhood. Research on the effects of punitive policies on pregnant women who use substances and their families is needed to optimize interventions to promote health and prevent family separation.[140,141] Research priorities should address these nuanced needs of women to advance the health of women who misuse alcohol or other substances, especially because recent research shows that the gap in rates of substance use is narrowing as alcohol and other substance use continues to rise among women.

Current NIH activities: NIH spending on substance misuse specific to women's health totaled $398 million in Fiscal Year 2023. NIDA, NIAAA, and the National Institute on Allergy and Infectious Diseases supported the largest amounts of substance misuse and women's health funding. The NIH-wide Helping to End Addiction Long-term® (HEAL) Initiative was launched as a response to the opioid use, addiction, and overdose public health crisis. Currently, the initiative funds more than 1,800 research projects nationwide. In 2021, NIDA released its Substance Use in Women Research Report, which details the implications of sex and gender differences on substance use. NIAAA recently launched a new initiative titled the Model Continuums of Care Initiative (MCCI) to advance health equity and end health disparities among women and girls in racial and ethnic minority communities. MCCI will apply the latest dissemination and implementation science approaches to significantly reduce the prevalence and impact of multimorbidity among racial and ethnic minority women and girls of reproductive age at risk and living with mental health disorders, SUDs, chronic stress, cardiopulmonary diseases, common metabolic disorders (e.g., diabetes), cancer, and HIV/AIDS.

10.

Violence Against Women and Trauma

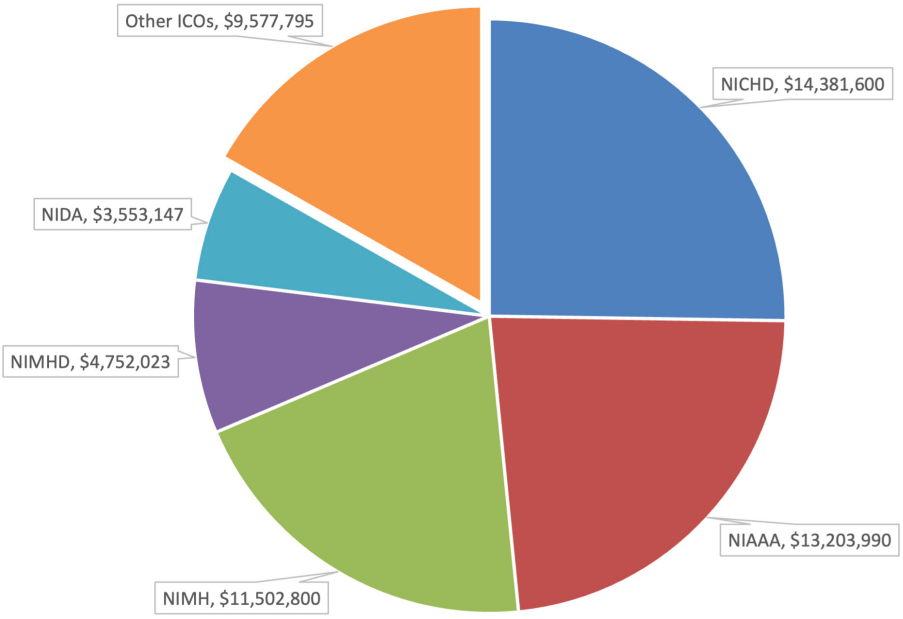
Background: Violence against women (VAW) refers to "any act of gender-based violence that results in, or is likely to result in, physical, sexual, or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life."[142] Violent acts go beyond just physical or sexual violations; they are also emotional, economic, and psychological in nature.[143] In addition to physical injury and death, women who experience violence have higher risk of experiencing many other conditions that affect their physical and mental health, including new onset of chronic diseases, depression, poorer pregnancy outcomes, and substance use.[144,145,146,147,148]

- Women are more likely than men to experience violence perpetrated by intimate partners.[149]
- About 41% of women have experienced sexual violence, physical violence, and/or stalking by an intimate partner and have reported an intimate partner violence (IPV)-related impact.[150]
- More than 61 million women and 53 million men have experienced psychological aggression by an intimate partner in their lifetime.[150]

Specific considerations relevant to women's health: The type, severity, and nature of violence experienced differ by gender. Women are three times more likely to experience rape or sexual assault than men.[149] Women are more likely to experience injuries from violence that are more severe, compared to men.[151] IPV, defined as "abuse or aggression that occurs in a romantic relationship," includes physical and sexual violence, stalking, and psychological aggression.[150] Although both men and women experience IPV, studies consistently show that the frequency and severity of IPV perpetrated against women is higher and that men are more likely to be perpetrators than are women. For three-quarters of women affected by IPV, violence occurs before age 25.[149] Approximately 6% of women experience some form of IPV during pregnancy, which evidence suggests is associated with unintended pregnancy.[152] Primary prevention of VAW requires addressing its root causes through

a holistic approach that includes promoting gender equality, challenging harmful cultural norms, dismantling systemic racial and ethnic inequalities, and strengthening legal and policy frameworks to protect women's rights.[153,154] It is also crucial to invest in and provide appropriate support services for survivors, such as health care, counseling, and legal aid, to help them process trauma and rebuild their lives, especially because 75% of women IPV survivors experience some form of injury related to IPV.[150]

FY23 Women's Health Funding: Violence Against Women



The women's health funding figures included in these Fact Sheets were derived with assistance from the Office of Extramural Research using draft RCDC data.

Scientific gaps and opportunities: Although violence significantly impacts the health of women, there are no nationally representative data sources that estimate the prevalence or incidence of trauma, and national surveys and crime statistics typically track only physical and sexual violence. As a social driver of health, VAW impacts the individual survivors, their autonomy when parenting, and social interactions when working, as well as society as a whole.[155,156] Stigma, lack of trust in the legal system, and fear of repercussions prevent reporting of the violence, which complicates efforts to accurately assess the true magnitude of VAW and its impact on the health and well-being of women. Currently, the causes and consequences of gender-based violence in older adults have been underexamined, particularly with respect to the continuation of abuse that was initiated in earlier adulthood. More comprehensive data are needed to develop targeted interventions and policies to prevent and address VAW. Effective violence prevention and response requires consideration of social and structural barriers that prevent help seeking.[154] Concerted efforts that address the underlying causes of VAW offer the greatest opportunity to realize sustained improvements in the prevention and ultimate elimination of VAW.

Current NIH activities: NIH spending related to violence against women and trauma (VAWT) totaled $56 million in Fiscal Year 2023. The *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, National Institute on Alcohol Abuse and Alcoholism, and National Institute of Mental Health supported the largest amounts of women's health and VAWT funding. In May 2023, the White House released its first-ever U.S. National Plan to End Gender-Based Violence: Strategies for Action to align government-wide initiatives to prevent and address sexual violence, IPV, stalking, and other forms of gender-based violence. The NIH Office of Research on Women's Health, the National Institute of Nursing Research, and five other institutes, centers, and offices from across NIH released a Request for Information in 2023 to gather public input on priority scientific directions in VAW. Their findings were published in a recent report. This request was intended to complement ongoing NIH Violence Research Initiatives to understand, prevent, and address VAWT and its health impacts.

Selected Women's Health NIH Activities—FY22 and FY23

Autoimmune Disease

- NIAMS: New Awardees Aim to Develop National Research Network That Will Explore the Role of the Exposome in Autoimmune Diseases
- NIAMS: NIAMS-funded Study Offers Clues to Why Women Are Disproportionately Affected by Autoimmune Disease
- NIAMS: Study Identifies Subtypes of Inflammation in People with Rheumatoid Arthritis
- NIH-OD: Connecting the Dots: Oral Infection to Rheumatoid Arthritis
- NIAMS: Exercise Energizes Patients with Autoimmune Disease
- NICHD: Preservation of Beta Cell Function in Type 1 Diabetes
- NIEHS: Dietary Risk Factors of Type 1 Diabetes
- NIEHS: When Normal Isn't Normal: Understanding the Skin of Lupus Patients

Cancer

- NCI: Targeting Adipose Inflammation to Improve Breast Cancer Outcomes
- NCI and NICHD: OCS Director's Series: Fertility Preservation for Cancer Survivors
- NIH-OIR: Heterogeneity of Breast Cancer Genomes: Going Beyond Therapy to Risk Assessment and Precision Healthcare
- NCI: The Influence of African Ancestry in Tumor Biology and Disparities in Breast Cancer
- NCI: Considerations for Body Composition in Ovarian Cancer Interventions and Analysis
- NCI: Cancer Moonshot Seminar: The Role of Epithelium Derived Alarmins in Breast Cancer Immunoprevention
- NIDDK: The More You Know ... About HPV and Cervical Cancer in Native American Communities
- NCI: Associations Between Aging Biomarkers and Cancer Risk and Outcomes: Findings from the Women's Health Initiative and the St. Jude Lifetime Cohort
- NIH: Mitochondria Driven Chromatin Remodeling Via Histone H3.1 Oxidation. Implications for EMT and Breast Cancer Metastasis
- NCI: Genetics of Breast Cancer in Women of Latin American Heritage Cardiovascular Disease and Women's Health
- NCI: The Estrogen Receptor Signaling in Female Reproductive Health: The Good, the Bad and the Deadly
- NCI: CURE Shining Stars Seminar: Expression of the Adipokines and Their Receptors in the Breast Tumor Microenvironment: The Link Between Adiposity and Poorer Breast Cancer Outcomes?
- NCI: Hereditary Cancer Series: Genotype Phenotype Associations and Lifetime Risks in Hereditary Diffuse Gastric Cancer and Lobular Breast Cancer Syndrome
- NIH: Cancer Genomics in Kenya: A Focus on Breast Cancer
- ORWH: Diverse Voices: Cancer Disparities: Methods and Measurement of Racial and Ethnic Diversity

Cardiovascular Disease

- NHLBI: Sex/gender Specific COVID 19 Outcomes and Management Relevant for Heart, Lung, Blood, and Sleep Disorders: From Bench to Bedside
- NIH: A Biomedical Engineering Talk! Sex Specific in Vitro Models of Aortic Valve Stenosis

Dementia

- NIA: National Research Summit on Care, Services, and Supports for Persons with Dementia and Their Caregivers
- NIA, ORWH: Women's Health and Aging Q&A

HIV

- ORWH: Diverse Voices: Intersectionality and the Health of Women Social Determinants and Uptake of Infectious Disease Control Measures
- NIH: Viral Reservoirs and Rebound in a Model of Perinatal HIV Infection

Maternal Morbidity and Mortality

- NIBIB: Technology to Improve Maternal Health Workshop
- NICHD: Connecting the Community for Maternal Health Challenge
- NICHD: IMPROVE Centers of Excellence
- NICHD: Maternal Fetal Medicine Units (MFMU)
- NICHD, NIBIB, OD and ORWH: NIH Radx Tech for Maternal Health Challenge
- NICHD: Task Force on Research Specific to Pregnant Women and Lactating Women (PRGLAC) Implementation Working Group of Council
- NICHD: Maternal and Pediatric Precision in Therapeutics (MPRINT) Hub
- NHLBI: Trans NIH Workshop: Innovative Approaches to Improve Maternal Health
- NIAID: Measuring and Predicting Reproductive Health: Advancing Technology and Fundamental Understanding in Maternal Fetal Immunity Workshop
- ODP: Addressing Maternal Mortality: Unveiling Racial Disparities and Charting a Path to Change
- NHLBI: Improving Maternal Health: Allies Sharing Promising Strategies
- NICHD, ORWH, OBSSR, OD: Reproductive Life Planning and Pregnancy for Sexual and Gender Minority (SGM) Communities
- NHLBI: Innovative Approaches to Improve Maternal Health Hybrid Workshop

Menopause

- NIAAA: Clinical Center Grand Rounds: Depression During Perimenopause: Clinical, Endocrine, and Cellular Characteristics
- NIA and NIAMS: Leveraging Existing Large Databases and Cohorts to Better Understand the Risks and Benefits of Long-Term Osteoporosis Therapy and Drug Holiday
- NIDDK: Premenopausal Osteoporosis and Pregnancy and Lactation Associated Osteoporosis
- NIA: Midlife Stress and the Hallmarks of Aging
- NIA: The Long-Term Effects of Pregnancy on Aging

Substance Use Disorder

- NIAAA: 2022 National Conference on Alcohol and Other Substance Use in Women and Girls: Advances in Prevention, Treatment, and Recovery
- NCCIH: From the Mouths of Babes: What Can Research on Babies, Moms, Stress, and Substance Use Tell Us About Resilience?
- NIDA: Impact of Comorbid COVID 19 and Substance Use During Pregnancy on Fetal and Infant Development
- NIAAA: NIAAA IWG on Drinking and Drug Use in Women and Girls: Achieving Equity in Women's Addiction Prevention and Treatment: Accent on Promising Programs
- ORWH: Diverse Voices: Intersectional Approaches to Substance Use and Misuse

Violence Against Women and Trauma

- NINR and ORWH: Violence Against Women RFI Report
- OBSSR: Violence Research Initiatives
- ORWH: Diverse Voices Virtual Talk: Violence and Women: Trauma and Addiction Impacts on Pregnant/postpartum Women

References

1 Ngo, S. T., Steyn, F. J., & McCombe, P. A. (2014). Gender differences in autoimmune disease. *Frontiers in Neuroendocrinology, 35*(3), 347–369. https://doi.org/10.1016/j.yfrne.2014.04.004

2 National Academies of Sciences, Engineering, and Medicine. (2022). *Enhancing NIH research on autoimmune disease*. National Academies Press. https://doi.org/10.17226/26554

3 Jacobson, D. L., Gange, S. J., Rose, N. R., & Graham, N. M. (1997). Epidemiology and estimated population burden of selected autoimmune diseases in the United States. *Clinical Immunology and Immunopathology, 84*(3), 223–243. https://doi.org/10.1006/clin.1997.4412

4 Angum, F., Khan, T., Kaler, J., Siddiqui, L., & Hussain, A. (2020). The prevalence of autoimmune disorders in women: A narrative review. *Cureus, 12*(5), Article e8094. https://doi.org/10.7759/cureus.8094

5 Miller F. W. (2023). The increasing prevalence of autoimmunity and autoimmune diseases: an urgent call to action for improved understanding, diagnosis, treatment, and prevention. *Current Opinion in Immunology, 80*, Article 102266. https://doi.org/10.1016/j.coi.2022.102266

6 Miller, F. W., Alfredsson, L., Costenbader, K. H., Kamen, D. L., Nelson, L. M., Norris, J. M., & De Roos, A. J. (2012). Epidemiology of environmental exposures and human autoimmune diseases: Findings from a National Institute of Environmental Health Sciences Expert Panel Workshop. *Journal of Autoimmunity, 39*(4), 259–271. https://doi.org/10.1016/j.jaut.2012.05.002

7 Conrad, N., Misra, S., Verbakel, J. Y., Verbeke, G., Molenberghs, G., Taylor, P. N., Mason, J., Sattar, N., McMurray, J. J. V., McInnes, I. B., Khunti, K., & Cambridge, G. (2023). Incidence, prevalence, and co-occurrence of autoimmune disorders over time and by age, sex, and socioeconomic status: A population-based cohort study of 22 million individuals in the UK. *Lancet (London, England), 401*(10391), 1878–1890. https://doi.org/10.1016/S0140-6736(23)00457-9

8 Desai, M.K., & Brinton, R.D. (2019). Autoimmune disease in women: Endocrine transition and risk across the lifespan. *Frontiers in Endocrinology, 10*, 265. https://doi.org/10.3389/fendo.2019.00265

9 Cozier, Y. C., Barbhaiya, M., Castro-Webb, N., Costenbader, K. H., & Rosenberg, L. (2021). A prospective study of reproductive factors in relation to risk of systemic lupus erythematosus among Black women. *Lupus, 30*(2), 204–210. https://doi.org/10.1177/0961203320973074

10 Shigesi, N., Kvaskoff, M., Kirtley, S., Feng, Q., Fang, H., Knight, J. C., Missmer, S. A., Rahmioglu, N., Zondervan, K. T., & Becker, C. M. (2019). The association between endometriosis and autoimmune diseases: a systematic review and meta-analysis. *Human Reproduction Update, 25*(4), 486–503. https://doi.org/10.1093/humupd/dmz014

11 De Carolis, S., Moresi, S., Rizzo, F., Monteleone, G., Tabacco, S., Salvi, S., Garufi, C., & Lanzone, A. (2019). Autoimmunity in obstetrics and autoimmune diseases in pregnancy. Best Practice & Research. *Clinical Obstetrics & Gynaecology, 60*, 66–76. https://doi.org/10.1016/j.bpobgyn.2019.03.003

12 Gupta, S., Nakabo, S., Blanco, L. P., O'Neil, L. J., Wigerblad, G., Goel, R. R., Mistry, P., Jiang, K., Carmona-Rivera, C., Chan, D. W., Wang, X., Pedersen, H. L., Gadkari, M., Howe, K. N., Naz, F., Dell'Orso, S., Hasni, S. A., Dempsey, C., Buscetta, A., Frischmeyer-Guerrerio, P. A., … Kaplan, M. J. (2020). Sex differences in neutrophil biology modulate response to type I interferons and immunometabolism. *Proceedings of the National Academy of Sciences of the United States of America, 117*(28), 16481–16491. https://doi.org/10.1073/pnas.2003603117

13 Forsyth, K.S., Jiwrajka, N., Lovell, C.D., Toothacre, N. E., & Anguera, M. C. (2024). The conneXion between sex and immune responses. *Nature Reviews. Immunology*. https://doi:10.1038/s41577-024-00996-9

14 Klein, S. L., & Flanagan, K. L. (2016). Sex differences in immune responses. *Nature Reviews. Immunology, 16*(10), 626–638. https://doi.org/10.1038/nri.2016.90

15 Dolgin E. (2024). Why autoimmune disease is more common in women: X chromosome holds clues. *Nature, 626*(7999), 466. https://doi.org/10.1038/d41586-024-00267-6

16 Martz, C. D., Allen, A. M., Fuller-Rowell, T. E., Spears, E. C., Lim, S. S., Drenkard, C., Chung, K., Hunter, E. A., & Chae, D. H. (2019). Vicarious racism stress and disease activity: The Black Women's Experiences Living with Lupus (BeWELL) Study. *Journal of Racial and Ethnic Health Disparities, 6*(5), 1044–1051. https://doi.org/10.1007/s40615-019-00606-8

17 Centers for Disease Control and Prevention. (2023). *Cancer and women*. https://www.cdc.gov/cancer/dcpc/resources/features/womenandcancer/index.htm

18 Siegel, R. L., Giaquinto, A. N., & Jemal, A. (2024). Cancer statistics, 2024. *CA: A Cancer Journal for Clinicians, 71*(1), 12–49. https://doi.org/10.3322/caac.21820

19 Zhu, Y., Shao, X., Wang, X., Liu, L., & Liang, H. (2019). Sex disparities in cancer. *Cancer Letters, 466*, 35–38. https://doi.org/10.1016/j.canlet.2019.08.017

20 Li, C. H., Haider, S., Shiah, Y. J., Thai, K., & Boutros, P. C. (2018). Sex differences in cancer driver genes and biomarkers. *Cancer Research, 78*(19), 5527–5537. https://doi.org/10.1158/0008-5472.CAN-18-0362

21 Li, C. H., Prokopec, S. D., Sun, R. X., Yousif, F., Schmitz, N., PCAWG Tumour Subtypes and Clinical Translation, Boutros, P. C., & PCAWG Consortium. (2020). Sex differences in oncogenic mutational processes. *Nature Communications, 11*(1), 4330. https://doi.org/10.1038/s41467-020-17359-2

22 Rubin, J. B., Lagas, J. S., Broestl, L., Sponagel, J., Rockwell, N., Rhee, G., Rosen, S. F., Chen, S., Klein, R. S., Imoukhuede, P., & Luo, J. (2020). Sex differences in cancer mechanisms. *Biology of Sex Differences, 11*(1), 17. https://doi.org/10.1186/s13293-020-00291-x

23 Wuidar, V., Gillot, L., Dias Da Silva, I., Lebeau, A., Gallez, A., & Pequeux, C. (2021). Sex-based differences in the tumor microenvironment. *Advances in Experimental Medicine and Biology, 1329*, 499–533. https://doi.org/10.1007/978-3-030-73119-9_23

24 Clocchiatti, A., Cora, E., Zhang, Y., & Dotto, G. P. (2016). Sexual dimorphism in cancer. *Nature Reviews. Cancer, 16*(5), 330–339. https://doi.org/10.1038/nrc.2016.30

25 Unger, J. M., Vaidya, R., Albain, K. S., LeBlanc, M., Minasian, L. M., Gotay, C. C., Henry, N. L., Fisch, M. J., Lee, S. M., Blanke, C. D., & Hershman, D. L. (2022). Sex differences in risk of severe adverse events in patients receiving immunotherapy, targeted therapy, or chemotherapy in cancer clinical trials. *Journal of Clinical Oncology, 40*(13), 1474–1486. https://doi.org/10.1200/jco.21.02377

26 Wagner, A.D. (2020). Sex differences in cancer chemotherapy effects, and why we need to reconsider BSA-based dosing of chemotherapy. *ESMO Open 5*(5). https://doi.org/10.1136%2Fesmoopen-2020-000770

27 Conforti, F., Pala, L., Bagnardi, V., De Pas, T., Martinetti, M., Viale, G., Gelber, R. D., & Goldhirsch, A. (2018). Cancer immunotherapy efficacy and patients' sex: a systematic review and meta-analysis. *The Lancet. Oncology, 19*(6), 737–746. https://doi.org/10.1016/s1470-2045(18)30261-4

28 Din, N. U., Ukoumunne, O. C., Rubin, G., Hamilton, W., Carter, B., Stapley, S., & Neal, R. D. (2015). Age and gender variations in cancer diagnostic intervals in 15 cancers: Analysis of data from the UK Clinical Practice Research Datalink. *PloS One, 10*(5), Article e0127717. https://doi.org/10.1371/journal.pone.0127717

29 McAlpine, J. N., Temkin, S. M., & Mackay, H. J. (2016). Endometrial cancer: Not your grandmother's cancer. *Cancer, 122*(18), 2787–2798. https://doi.org/10.1002/cncr.30094

30 Forjaz, G., Ries, L., Devasia, T. P., Flynn, G., Ruhl, J., & Mariotto, A. B. (2023). Long-term cancer survival trends by updated summary stage. *Cancer Epidemiology, Biomarkers & Prevention, 32*(11), 1508–1517. https://doi.org/10.1158/1055-9965.epi-23-0589

31 Jemal, A., Schafer, E. J., Sung, H., Bandi, P., Kratzer, T., Islami, F., & Siegel, R. L. (2023). The burden of lung cancer in women compared with men in the US. *JAMA Oncology, 9*(12):1727–1728. https://doi.org/10.1001/jamaoncol.2023.4415

32 Rimel, B. J., Kunos, C. A., Macioce, N., & Temkin, S. M. (2022). Current gaps and opportunities in screening, prevention, and treatment of cervical cancer. *Cancer, 128*(23), 4063–4073. https://doi.org/10.1002/cncr.34487

33 Steinberg, J. R., Turner, B. E., Weeks, B. T., Magnani, C. J., Wong, B. O., Rodriguez, F., Yee, L. M., & Cullen, M. R. (2021). Analysis of female enrollment and participant sex by burden of disease in US clinical trials between 2000 and 2020. *JAMA Network Open, 4*(6), Article e2113749. https://doi.org/10.1001/jamanetworkopen.2021.13749

34 Centers for Disease Control and Prevention. 2017. *Leading causes of death-females-all races and origins-United States*.

35 Virani, S. S., Alonso, A., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Chang, A. R., Cheng, S., Delling, F. N., Djousse, L., Elkind, M. S. V., Ferguson, J. F., Fornage, M., Khan, S. S., Kissela, B. M., Knutson, K. L., Kwan, T. W., Lackland, D. T., Lewis, T. T., … American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2020). Heart disease and stroke statistics–2020 Update: A report from the American Heart Association. *Circulation, 141*(9), e139–e596. https://doi.org/10.1161/cir.0000000000000757

36 Mensah, G. A., Wei, G. S., Sorlie, P. D., Fine, L. J., Rosenberg, Y., Kaufmann, P. G., Mussolino, M. E., Hsu, L. L., Addou, E., Engelgau, M. M., & Gordon, D. (2017). Decline in cardiovascular mortality: Possible causes and implications. *Circulation Research, 120*(2), 366–380. https://doi.org/10.1161/CIRCRESAHA.116.309115

37 Martin, S. S., Aday, A. W., Almarzooq, Z. I., Anderson, C. A. M., Arora, P., Avery, C. L., Baker-Smith, C. M., Barone Gibbs, B., Beaton, A. Z., Boehme, A. K., Commodore-Mensah, Y., Currie, M. E., Elkind, M. S. V., Evenson, K. R., Generoso, G., Heard, D. G., Hiremath, S., Johansen, M. C., Kalani, R., Kazi, D. S., … American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2024). 2024 heart disease and stroke statistics: A report of US and global data from the American Heart Association. *Circulation, 149*(8), e347–e913. https://doi.org/10.1161/CIR.0000000000001209

38 Centers for Disease Control and Prevention. (2021). Hypertension prevalence, treatment and control estimates among US adults aged 18 years and older applying the criteria from the American College of Cardiology and American Heart Association's 2017 Hypertension Guideline—NHANES. 2015–2018. U.S. Department of Health and Human Services.

39 Hiteshi, A. K., Li, D., Gao, Y., Chen, A., Flores, F., Mao, S. S., & Budoff, M. J. (2014). Gender differences in coronary artery diameter are not related to body habitus or left ventricular mass. *Clinical Cardiology, 37*(10), 605–609. https://doi.org/10.1002/clc.22310

40 Iorga, A., Cunningham, C. M., Moazeni, S., Ruffenach, G., Umar, S., & Eghbali, M. (2017). The protective role of estrogen and estrogen receptors in cardiovascular disease and the controversial use of estrogen therapy. *Biology of Sex Differences, 8*(1), 33. https://doi.org/10.1186/s13293-017-0152-8

41 Government Accountability Office. (2020). *Maternal mortality: trends in pregnancy-related deaths and federal efforts to reduce them*. GAO Publication No. 13-255. Government Printing Office. https://www.gao.gov/products/gao-20-248

42 Tita, A. T., Szychowski, J. M., Boggess, K., Dugoff, L., Sibai, B., Lawrence, K., Hughes, B. L., Bell, J., Aagaard, K., Edwards, R. K., Gibson, K., Haas, D. M., Plante, L., Metz, T., Casey, B., Esplin, S., Longo, S., Hoffman, M., Saade, G. R., Hoppe, K. K., … Chronic Hypertension and Pregnancy (CHAP) Trial Consortium. (2022). Treatment for mild chronic hypertension during pregnancy. *The New England Journal of Medicine, 386*(19), 1781–1792. https://doi.org/10.1056/NEJMoa2201295

43 Coutinho, T., Lamai, O., & Nerenberg, K. (2018). Hypertensive disorders of pregnancy and cardiovascular diseases: Current knowledge and future directions. *Current Treatment Options in Cardiovascular Medicine, 20*(7), 56. https://doi.org/10.1007/s11936-018-0653-8

44 Behrens, I., Basit, S., Lykke, J. A., Ranthe, M. F., Wohlfahrt, J., Bundgaard, H., Melbye, M., & Boyd, H. A. (2016). Association between hypertensive disorders of pregnancy and later risk of cardiomyopathy. *JAMA, 315*(10), 1026–1033. https://doi.org/10.1001/jama.2016.1869

45 O'Neil, A., Scovelle, A. J., Milner, A. J., & Kavanagh, A. (2018). Gender/sex as a social determinant of cardiovascular risk. *Circulation, 137*(8), 854–864. https://doi.org/10.1161/circulationaha.117.028595

46 U.S. Environmental Protection Agency. (2023). *Air pollution and cardiovascular disease basics*. https://www.epa.gov/air-research/air-pollution-and-cardiovascular-disease-basics

47 Chinn, J. J., Martin, I. K., & Redmond, N. (2021). Health equity among Black Women in the United States. *Journal of Women's Health, 30*(2), 212–219. https://doi.org/10.1089/jwh.2020.8868

48 Okoth, K., Chandan, J. S., Marshall, T., Thangaratinam, S., Thomas, G. N., Nirantharakumar, K., & Adderley, N. J. (2020). Association between the reproductive health of young women and cardiovascular disease in later life: Umbrella review. *BMJ (Clinical Research Ed.), 371*, m3502. https://doi.org/10.1136/bmj.m3502

49 Faubion, S. S., Crandall, C., Davis, L. C., Khoudaqry, S. R. E., Hodis, H. N., Lobo, R. A., Maki, P. M., Manson, J. E., Pinkerton. J. V., Santoro, N., Shifren, J. L., Shufelt, C., Thurston, R. C., & Wolfman, W. (2022). The 2022 Hormone Therapy Position Statement of The North American Menopause Society. *Menopause, 29*(7), 767–794. https://doi.org/10.1097/gme.0000000000002028

50 National Institute of Aging. (2022). *What is dementia? Symptoms, types, and diagnosis*. https://www.nia.nih.gov/health/alzheimers-and-dementia/what-dementia-symptoms-types-and-diagnosis

51 Centers for Disease Control and Prevention. (2022, last reviewed). *Leading causes of death – females – all races and origins – United States, 2018*. https://www.cdc.gov/women/lcod/2018/index.html

52 Alzheimer's Association. (2019). 2019 Alzheimer's disease facts and figures. *Alzheimer's & Dementia, 15*(3), 321–387. https://doi.org/10.1016/j.jalz.2019.01.010

53 Mielke, M.M. (2018). Sex and gender differences in Alzheimer's disease dementia. *The Psychiatric Times, 35*(11), 14–17.

54 Valencia-Olvera, A. C., Maldonado Weng, J., Christensen, A., LaDu, M. J., & Pike, C. J. (2023). Role of estrogen in women's Alzheimer's disease risk as modified by APOE. *Journal of Neuroendocrinology, 35*(2), Article e13209. https://doi.org/10.1111/jne.13209

55 Rocca, W. A., Gazzuola-Rocca, L., Smith, C. Y., Grossardt, B. R., Faubion, S. S., Shuster, L. T., Kirkland, J. L., Stewart, E. A., & Miller, V. M. (2016). Accelerated accumulation of multimorbidity after bilateral oophorectomy: A population-based cohort study. *Mayo Clinic Proceedings, 91*(11), 1577–1589. https://doi.org/10.1016/j.mayocp.2016.08.002

56 Nerattini, M., Jett, S., Andy, C., Carlton, C., Zarate, C., Boneu, C., Battista, M., Pahlajani, S., Loeb-Zeitlin, S., Havryulik, Y., Williams, S., Christos, P., Fink, M., Brinton, R. D., & Mosconi, L. (2023). Systematic review and meta-analysis of the effects of menopause hormone therapy on risk of Alzheimer's disease and dementia. *Frontiers in Aging Neuroscience, 15*, Article 1260427. https://doi.org/10.3389/fnagi.2023.1260427

57 Pourhadi, N., Mørch, L.S., Holm, E.A., Torp-Pedersen, C., & Meaidi, A. (2024). Dementia in women using estrogen-only therapy. *JAMA, 331*(2), 160–162. https://doi.org/10.1001/jama.2023.23784

58 Peavy, G. M., Jacobson, M. W., Salmon, D. P., Gamst, A. C., Patterson, T. L., Goldman, S., Mills, P. J., Khandrika, S., & Galasko, D. (2012). The influence of chronic stress on dementia-related diagnostic change in older adults. *Alzheimer disease and Associated Disorders, 26*(3), 260–266. https://doi.org/10.1097%2FWAD.0b013e3182389a9c

59 Pinho-Gomes, A. C., Gong, J., Harris, K., Woodward, M., & Carcel, C. (2022). Dementia clinical trials over the past decade: are women fairly represented? *BMJ Neurology Open, 4*(2), Article e000261. https://doi.org/10.1136/bmjno-2021-000261

60 Kaiser Family Foundation. (2023). *The global HIV/AIDS epidemic*. https://www.kff.org/global-health-policy/fact-sheet/the-global-hiv-aids-epidemic/

61 Centers for Disease Control and Prevention. (2020). *HIV surveillance report, 2020*. U.S. Department of Health and Human Services.

62 UNAIDS. (2022). *Global factsheets*. https://aidsinfo.unaids.org/

63 Becasen, J. S., Denard, C. L., Mullins, M. M., Higa, D. H., & Sipe, T. A. (2019). Estimating the prevalence of HIV and sexual behaviors among the US transgender population: A systematic review and meta-analysis, 2006-2017. *American Journal of Public Health, 109*(1), e1–e8. https://doi.org/10.2105/ajph.2018.304727

64 Barr. E., Marshall, L. J., Collins, L. F., Godfrey, C., St Vil, N. M., Stockman, J. K., Davey, D. J., Dong, K. L., Temkin, S. M., Glenshaw, M., Byrd, C., Clayton, J. A., & Goodenow, M. M. (2024). Centring the health of women across the HIV research continuum. *The Lancet. HIV, 11*(3), e186-e194. https://doi.org/10.1016/S2352-3018(24)00004-3

65 Scully, E. P. (2018). Sex differences in HIV infection. *Current HIV/AIDS Reports, 15*(2), 136–146. https://doi.org/10.1007/s11904-018-0383-2

66 Masson, L., Passmore, J. A., Liebenberg, L. J., Werner, L., Baxter, C., Arnold, K. B., Williamson, C., Little, F., Mansoor, L. E., Naranbhai, V., Lauffenburger, D. A., Ronacher, K., Walzl, G., Garrett, N. J., Williams, B. L., Couto-Rodriguez, M., Hornig, M., Lipkin, W. I., Grobler, A., Abdool Karim, Q., … Abdool Karim, S. S. (2015). Genital inflammation and the risk of HIV acquisition in women. *Clinical Infectious Diseases, 61*(2), 260–269. https://doi.org/10.1093/cid/civ298

67 Gandhi, M., Bacchetti, P., Miotti, P., Quinn, T. C., Veronese, F., & Greenblatt, R. M. (2002). Does patient sex affect human immunodeficiency virus levels? *Clinical Infectious Diseases, 35*(3), 313–322. https://doi.org/10.1086/341249

68 Scully, E. P., Aga, E., Tsibris, A., Archin, N., Starr, K., Ma, Q., Morse, G. D., Squires, K. E., Howell, B. J., Wu, G., Hosey, L., Sieg, S. F., Ehui, L., Giguel, F., Coxen, K., Dobrowolski, C., Gandhi, M., Deeks, S., Chomont, N., Connick, E., … Gandhi, R. T. (2022). Impact of tamoxifen on vorinostat-induced human immunodeficiency virus expression in women on antiretroviral therapy: AIDS Clinical Trials Group A5366, The MOXIE Trial. *Clinical Infectious Diseases, 75*(8), 1389–1396. https://doi.org/10.1093/cid/ciac136

69 Lemons-Lyn, A. B., Baugher, A. R., Dasgupta, S., Fagan, J. L., Smith, S. G., & Shouse, R. L. (2021). Intimate partner violence experienced by adults with diagnosed HIV in the U.S. *American journal of Preventive Medicine, 60*(6), 747–756. https://doi.org/10.1016/j.amepre.2020.12.019

70 Kouyoumdjian, F. G., Calzavara, L. M., Bondy, S. J., O'Campo, P., Serwadda, D., Nalugoda, F., Kagaayi, J., Kigozi, G., Wawer, M., & Gray, R. (2013). Intimate partner violence is associated with incident HIV infection in women in Uganda. *AIDS (London, England), 27*(8), 1331–1338. https://doi.org/10.1097/QAD.0b013e32835fd851

71 Mangold, J. F., Goswami, R., Nelson, A. N., Martinez, D. R., Fouda, G. G., & Permar, S. R. (2021). Maternal intervention to prevent mother-to-child transmission of HIV: Moving beyond antiretroviral therapy. *The Pediatric Infectious Disease Journal, 40*(5S), S5–S10. https://doi.org/10.1097/inf.0000000000002774

72 Connor, E. M., Sperling, R. S., Gelber, R., Kiselev, P., Scott, G., O'Sullivan, M. J., VanDyke, R., Bey, M., Shearer, W., & Jacobson, R. L. (1994). Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. Pediatric AIDS Clinical Trials Group Protocol 076 Study Group. *The New England Journal of Medicine, 331*(18), 1173–1180. https://doi.org/10.1056/NEJM199411033311801

73 Barr, L., & Jefferys, R. (2020). A landscape analysis of HIV cure-related clinical research in 2019. *Journal of Virus Eradication, 6*(4), 100010. https://doi.org/10.1016/j.jve.2020.100010

74 Collins, L. F., Palella, F. J., Jr, Mehta, C. C., Holloway, J., Stosor, V., Lake, J. E., Brown, T. T., Topper, E. F., Naggie, S., Anastos, K., Taylor, T. N., Kassaye, S., French, A. L., Adimora, A. A., Fischl, M. A., Kempf, M. C., Koletar, S. L., Tien, P. C., Ofotokun, I., & Sheth, A. N. (2023). Aging-related comorbidity burden among women and men with or at-risk for HIV in the US, 2008-2019. *JAMA Network Open, 6*(8), Article e2327584. https://doi.org/10.1001/jamanetworkopen.2023.27584

75 Firoz, T., Chou, D., von Dadelszen, P., Agrawal, P., Vanderkruik, R., Tunçalp, O., Magee, L. A., van Den Broek, N., Say, L. (2013). Measuring maternal health: Focus on maternal morbidity. *Bulletin of the World Health Organization, 91*(10), 794–796. https://doi.org/10.2471/BLT.13.117564

76 Kilpatrick, S. K., & Ecker, J. L. (2016). Severe maternal morbidity: screening and review. *American Journal of Obstetrics and Gynecology, 215*(3), B17–B22. https://doi.org/10.1016/j.ajog.2016.07.050

77 National Institutes of Health, Office of Research on Women's Health. (2019). *Maternal morbidity and mortality: What do we know? How are we addressing it?* https://orwh.od.nih.gov/sites/orwh/files/docs/ORWH_MMM_Booklet_93020_508c.pdf

78 Centers for Disease Control and Prevention. (2023). *Severe maternal morbidity*. https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html

79 Hoyert, D. L. (2022). *Maternal mortality rates in the United States, 2020*. Centers for Disease Control and Prevention. https://www.cdc.gov/nchs/data/hestat/maternal-mortality/2020/maternal-mortality-rates-2020.htm

80 Centers for Disease Control and Prevention. (2022). *Four in 5 pregnancy-related deaths in the U.S. are preventable*. https://www.cdc.gov/media/releases/2022/p0919-pregnancy-related-deaths.html

81 Howell, E. A. (2018). Reducing disparities in severe maternal morbidity and mortality. *Clinical Obstetrics and Gynecology, 61*(2), 387–399. https://doi.org/10.1097/GRF.0000000000000349

82 Declercq, E., & Zephyrin, L. (2021). *Severe maternal morbidity in the United States: A primer*. Commonwealth Fund, 28.

83 Trost, S., Beauregard, J., Chandra, G., Njie, F., Berry, J., Harvey, A., & Goodman, D. A. (2022) Pregnancy-related deaths: data from maternal mortality review committees in 36 US states, 2017–2019. *Education, 45*(10), 1.0. https://www.cdc.gov/reproductivehealth/maternal-mortality/docs/pdf/pregnancy-related-deaths-data-mmrcs-2017-2019-h.pdf

84 Byrne, J. J., Saucedo, A. M., & Spong, C. Y. (2020). Task force on research specific to pregnant and lactating women. *Seminars in Perinatology*. Elsevier.

85 Garovic, V. D., & August, P. (2013). Preeclampsia and the future risk of hypertension: the pregnant evidence. *Current Hypertension Reports, 15*(2), 114–121. https://doi.org/10.1007/s11906-013-0329-4

86 Vounzoulaki, E., Khunti, K., Abner, S. C., Tan, B. K., Davies, M. J., & Gillies, C. L. (2020). Progression to type 2 diabetes in women with a known history of gestational diabetes: Systematic review and meta-analysis. *BMJ, 369*. https://doi.org/10.1136/bmj.m1361

87 Snipe, M. (2023). The story behind 'Dangerous Deliveries.' *Capital B News*. https://capitalbnews.org/dangerous-deliveries-about/

88 World Health Organization. (2015). *Trends in maternal mortality: 1990-2015: estimates from WHO, UNICEF, UNFPA, World Bank Group and the United Nations population division*. World Health Organization.

89 Tikkanen, R., Gunja, M. Z., FitzGerald, M., & Zephyrin, L. (2020). *Maternal mortality and maternity care in the United States compared to 10 other developed countries*. The Commonwealth Fund, 1–17.

90 Declercq, E., & Zephyrin, L. (2020) Maternal mortality in the United States: A primer. The Commonwealth Fund, 10.

91 Davis, S. R., Pinkerton, J., Santoro, N., & Simoncini, T. (2023). Menopause-Biology, consequences, supportive care, and therapeutic options. *Cell, 186*(19), 4038–4058. https://doi.org/10.1016/j.cell.2023.08.016

92 Williams, R. E., Kalilani, L., DiBenedetti, D. B., Zhou, X., Fehnel, S. E., & Clark, R. V. (2007). Healthcare seeking and treatment for menopausal symptoms in the United States. *Maturitas, 58*(4), 348–358. https://doi.org/10.1016/j.maturitas.2007.09.006

93 Paramsothy, P., Harlow, S. D., Nan, B., Greendale, G. A., Santoro, N., Crawford, S. L., Gold, E. B., Tepper, P. G., & Randolph, J. F., Jr (2017). Duration of the menopausal transition is longer in women with young age at onset: the multiethnic Study of Women's Health Across the Nation. *Menopause (New York, N.Y.), 24*(2), 142–149. https://doi.org/10.1097/GME.0000000000000736

94 Faubion, S. S., Enders, F., Hedges, M. S., Chaudhry, R., Kling, J. M., Shufelt, C. L., Saadedine, M., Mara, K., Griffin, J. M., & Kapoor, E. (2023). Impact of menopause symptoms on women in the workplace. *Mayo Clinic Proceedings, 98*(6), 833–845. https://doi.org/10.1016/j.mayocp.2023.02.025

95 Sarrel, P., Portman, D., Lefebvre, P., Lafeuille, M. H., Grittner, A. M., Fortier, J., Gravel, J., Duh, M. S., & Aupperle, P. M. (2015). Incremental direct and indirect costs of untreated vasomotor symptoms. *Menopause (New York, N.Y.), 22*(3), 260–266. https://doi.org/10.1097/gme.0000000000000320

96 Gold, E. B., Colvin, A., Avis, N., Bromberger, J., Greendale, G. A., Powell, L., Sternfeld, B., & Matthews, K. (2006). Longitudinal analysis of the association between vasomotor symptoms and race/ethnicity across the menopausal transition: study of women's health across the nation. *American Journal of Public Health, 96*(7), 1226–1235. https://doi.org/10.2105/ajph.2005.066936

97 Avis, N. E., Crawford, S. L., & Green, R. (2018). Vasomotor symptoms across the menopause transition: differences among women. *Obstetrics and Gynecology Clinics, 45*(4), 629–640. https://doi.org/10.1016%2Fj.ogc.2018.07.005

98 Riggs, B. L. (2002). Endocrine causes of age-related bone loss and osteoporosis. *Endocrine Facets of Ageing: Novartis Foundation Symposium*, 242. Wiley Online Library.

99 Porter, J. L., Varacallo, M. & Castano, M. (2023) Osteoporosis (Nursing). *StatPearls*. StatPearls Publishing.

100 Conley, R. B., Adib, G., Adler, R. A., Åkesson, K. E., Alexander, I. M., Amenta, K. C., Blank, R. D., Brox, W. T., Carmody, E. E., Chapman-Novakofski, K., Clarke, B. L., Cody, K. M., Cooper, C., Crandall, C. J., Dirschl, D. R., Eagen, T. J., Elderkin, A. L., Fujita, M., Greenspan, S. L., Halbout, P., … Kiel, D. P. (2020). Secondary Fracture Prevention: Consensus Clinical Recommendations from a Multistakeholder Coalition. *Journal of Bone and Mineral Research, 35*(1), 36–52. https://doi.org/10.1002/jbmr.3877

101 Rossouw, J. E., Anderson, G. L., Prentice, R. L., LaCroix, A. Z., Kooperberg, C., Stefanick, M. L., Jackson, R. D., Beresford, S. A., Howard, B. V., Johnson, K. C., Kotchen, J. M., Ockene, J., & Writing Group for the Women's Health Initiative Investigators (2002). Risks and benefits of estrogen plus progestin in healthy postmenopausal women: principal results from the Women's Health Initiative randomized controlled trial. *JAMA, 288*(3), 321–333. https://doi.org/10.1001/jama.288.3.321

102 Anderson, G. L., Limacher, M., Assaf, A. R., Bassford, T., Beresford, S. A., Black, H., Bonds, D., Brunner, R., Brzyski, R., Caan, B., Chlebowski, R., Curb, D., Gass, M., Hays, J., Heiss, G., Hendrix, S., Howard, B. V., Hsia, J., Hubbell, A., Jackson, R., … Women's Health Initiative Steering Committee (2004). Effects of conjugated equine estrogen in postmenopausal women with hysterectomy: the Women's Health Initiative randomized controlled trial. *JAMA, 291*(14), 1701–1712. https://doi.org/10.1001/jama.291.14.1701

103 Manson, J. E., Chlebowski, R. T., Stefanick, M. L., Aragaki, A. K., Rossouw, J. E., Prentice, R. L., Anderson, G., Howard, B. V., Thomson, C. A., LaCroix, A. Z., Wactawski-Wende, J., Jackson, R. D., Limacher, M., Margolis, K. L., Wassertheil-Smoller, S., Beresford, S. A., Cauley, J. A., Eaton, C. B., Gass, M., Hsia, J., … Wallace, R. B. (2013). Menopausal hormone therapy and health outcomes during the intervention and extended poststopping phases of the Women's Health Initiative randomized trials. *JAMA, 310*(13), 1353–1368. https://doi.org/10.1001/jama.2013.278040

104 Prentice, R. L., Aragaki, A. K., Chlebowski, R. T., Rossouw, J. E., Anderson, G. L., Stefanick, M. L., Wactawski-Wende, J., Kuller, L. H., Wallace, R., Johnson, K. C., Shadyab, A. H., Gass, M., & Manson, J. E. (2021). Randomized trial evaluation of the benefits and risks of menopausal hormone therapy among women 50-59 years of age. *American Journal of Epidemiology, 190*(3), 365–375. https://doi.org/10.1093/aje/kwaa210

105 Substance Abuse and Mental Health Services Administration. *What is mental health?* https://www.samhsa.gov/mental-health

106 National Institute of Mental Health. *Mental illness*. https://www.nimh.nih.gov/health/statistics/mental-illness

107 Centers for Disease Control and Prevention. (2018). *Mental health: Data and publications*. https://www.cdc.gov/mentalhealth/data_publications/index.htm

108 Office of Disease Prevention and Health Promotion. *Mental health and mental disorders—Healthy People 2030*. https://health.gov/healthypeople/objectives-and-data/browse-objectives/mental-health-and-mental-disorders

109 American Psychiatric Association. (2017). *Mental health disparities: Women's mental health*. American Psychiatric Association. https://www.psychiatry.org/getmedia/aa325a61-5b60-4c71-80f1-dc80cf83c383/Mental-Health-Facts-for-Women.pdf

110 Bauman, B. L., Ko, J. Y., Cox, S., D'Angelo, D. V., Warner, L., Folger, S., Tevendale, H. D., Coy, K. C., Harrison., & Barfield, W, D. (2018). Vital Signs: postpartum depressive symptoms and provider discussions about perinatal depression — United States, 2018. *MMWR Morbidity and Mortality Weekly Report, 69*, 575–581. https://doi.org/10.15585/mmwr.mm6919a2

111 Riecher-Rössler, A. (2017). Oestrogens, prolactin, hypothalamic-pituitary-gonadal axis, and schizophrenic psychoses. *The Lancet Psychiatry, 4*(1), 63–72. https://doi.org/10.1016/S2215-0366(16)30379-0

112 Christiansen, D. M., McCarthy, M. M., & Seeman, M. V. (2022). Where sex meets gender: How sex and gender come together to cause sex differences in mental illness. *Frontiers in Psychiatry, 13*, 856436. https://doi.org/10.3389/fpsyt.2022.856436

113 Nolan, L. N., & Hughes, L. (2022). Premenstrual exacerbation of mental health disorders: a systematic review of prospective studies. *Archives of Women's Mental Health, 25*(5), 831–852. https://doi.org/10.1007/s00737-022-01246-4

114 Fedock, G. L., & Alvarez, C. (2018). Differences in screening and treatment for antepartum versus postpartum patients: are providers implementing the guidelines of care for perinatal depression? *Journal of Women's Health, 27*(9), 1104–1113. https://doi.org/10.1089/jwh.2017.6765

115 Soares, C. N. (2023). Menopause and mood: the role of estrogen in midlife depression and beyond. *Psychiatric Clinics*, 46(3), 463–473. https://doi.org/10.1016/j.psc.2023.04.004

116 Rehm, J., & Shield, K. D. (2019). Global burden of disease and the impact of mental and addictive disorders. *Current Psychiatry Reports, 21*(2), 1–7. https://doi.org/10.1007/s11920-019-0997-0

117 Akinyemi, O., Ogundare, T., Oladunjoye, A. F., Nasef, K. E., Lipscombe, C., Akinbote, J. A., & Bezold, M. (2023). Factors associated with suicide/self-inflicted injuries among women aged 18-65 years in the United States: A 13-year retrospective analysis of the National Inpatient Sample database. *PloS One, 18*(10), Article e0287141. https://doi.org/10.1371/journal.pone.0287141

118 Sagar-Ouriaghli, I., Godfrey, E., Bridge, L., Meade, L., & Brown, J. S. L. (2019). Improving mental health service utilization among men: A systematic review and synthesis of behavior change techniques within interventions targeting help-seeking. *American Journal of Men's Health, 13*(3), Article 1557988319857009. https://doi.org/10.1177/1557988319857009

119 Terlizzi, E. P., & Norris, T. (2020). Mental health treatment among adults: United States, 2020. Centers for Disease Control and Prevention. https://www.cdc.gov/nchs/data/databriefs/db419.pdf

120 National Institute on Drug Abuse. (2021). Substance use in women research report. https://nida.nih.gov/publications/research-reports/substance-use-in-women/summary

121 Substance Abuse and Mental Health Services Administration. (2023). HHS, SAMHSA release 2022 National Survey on Drug Use and Health data. https://www.samhsa.gov/newsroom/press-announcements/20231113/hhs-samhsa-release-2022-nsduh-data

122 American Psychiatric Association. (2013). *Substance-related and addictive disorders*. https://www.psychiatry.org/file%20library/psychiatrists/practice/dsm/apa_dsm-5-substance-use-disorder.pdf

123 Substance Abuse and Mental Health Services Administration. (2022). *2020 National Survey on Drug Use and Health: Women*. U.S. Department of Health and Human Services.

124 Jones C. M., Clayton, H. B., Deputy, N. P., Roehler, D. R., Ko, J. Y., Esser, M. B., Brookmeyer, K. A., & Hertz, M. (2020). Prescription opioid misuse and use of alcohol and other substances among high school students—Youth Risk Behavior Survey, United States, 2019. *Morbidity and Mortality Weekly Report. Supplements/MMWR Supplements, 69*(1), 38-46. https://doi.org/10.15585/mmwr.su6901a5

125 Spencer, M. R., Miniño, A. M., & Warner, M. (2022). *Drug overdose deaths in the United States, 2001–2021*. Centers for Disease Control and Prevention. https://dx.doi.org/10.15620/cdc:122556

126 National Institute of Mental Health. (2023). *Substance use and co-occurring mental disorders*. https://www.nimh.nih.gov/health/topics/substance-use-and-mental-health

127 McHugh, R. K., Votaw, V. R., Sugarman, D. E., & Greenfield, S. F. (2018). Sex and gender differences in substance use disorders. *Clinical Psychology Review, 66*, 12–23. https://doi.org/10.1016/j.cpr.2017.10.012

128 Fonseca, F., Robles-Martínez, M., Tirado-Muñoz, J., Alías-Ferri, M., Mestre-Pintó, J. I., Coratu, A. M., & Torrens, M. (2021). A gender perspective of addictive disorders. *Current Addiction Reports, 8*(1), 89–99. https://doi.org/10.1007/s40429-021-00357-9

129 Substance Abuse and Mental Health Services Administration. (2017). *Treatment Episode Data Set (TEDS): 2014, national discharges from substance abuse treatment services*. https://www.samhsa.gov/data/report/treatment-episode-data-set-teds-2014-national-disch

130 Greenfield, S. F., Back, S. E., Lawson, K., & Brady, K. T. (2010). Substance abuse in women. *The Psychiatric clinics of North America, 33*(2), 339–355. https://doi.org/10.1016/j.psc.2010.01.004

131 Joyce, K. M., Good, K. P., Tibbo, P., Brown, J., & Stewart, S. H. (2021). Addictive behaviors across the menstrual cycle: A systematic review. *Archives of Women's Mental Health, 24*(4), 529–542. https://doi.org/10.1007/s00737-020-01094-0

132 Guinle, M. I. B., & Sinha, R. (2020) The role of stress, trauma, and negative affect in alcohol misuse and alcohol use disorder in women. *Alcohol Research, 40*(2). https://doi.org/10.35946/arcr.v40.2.05

133 Meyers, S. A., Smith, L. R., Luisa Mittal, M., Strathdee, S. A., Garfein, R. S., Guise, A., Werb, D., & Rafful, C. (2020). The role of gender and power dynamics in injection initiation events within intimate partnerships in the US-Mexico border region. *Culture, Health & Sexuality, 22*(9), 1080–1095. https://doi.org/10.1080/13691058.2019.1651903

134 Manuel, J. I., & Lee, J. (2017). Gender differences in discharge dispositions of emergency department visits involving drug misuse and abuse—2004-2011. *Substance Abuse Treatment, Prevention, and Policy, 12*(1), 28. https://doi.org/10.1186/s13011-017-0114-5

135 Verissimo, A.D.O. and Grella, C. E. (2017). Influence of gender and race/ethnicity on perceived barriers to help-seeking for alcohol or drug problems. *Journal of substance abuse treatment, 75*, 54-61.

136 Khan, S. S., Secades-Villa, R., Okuda, M., Wang, S., Pérez-Fuentes, G., Kerridge, B. T., & Blanco, C. (2013). Gender differences in cannabis use disorders: Results from the National Epidemiologic Survey of Alcohol and Related Conditions. *Drug and Alcohol Dependence, 130*(1-3), 101–108. https://doi.org/10.1016/j.drugalcdep.2012.10.015

137 Martin, C. E., Scialli, A., & Terplan, M. (2020). Unmet substance use disorder treatment need among reproductive age women. *Drug and Alcohol Dependence, 206*, Article 107679. https://doi.org/10.1016/j.drugalcdep.2019.107679

138 Han, B., Compton, W. M., Einstein, E. B., Elder, E., & Volkow, N. D. (2024). Pregnancy and postpartum drug overdose deaths in the US before and during the COVID-19 pandemic. *JAMA Psychiatry, 81*(3), 270–283. https://doi.org/10.1001/jamapsychiatry.2023.4523

139 White, S. A., Lee, R., Kennedy-Hendricks, A., Sherman, S. G., & McGinty, E. E. (2023). Perspectives of U.S. harm reduction advocates on persuasive message strategies. *Harm Reduction Journal, 20*(1), 112. https://doi.org/10.1186/s12954-023-00849-z

140 Meyer, J. P., Isaacs, K., El-Shahawy, O., Burlew, A. K., & Wechsberg, W. (2019). Research on women with substance use disorders: Reviewing progress and developing a research and implementation roadmap. *Drug and Alcohol Dependence, 197*, 158–163. https://doi.org/10.1016/j.drugalcdep.2019.01.017

141 Paltrow, L. M., & Flavin, J. (2013). Arrests of and forced interventions on pregnant women in the United States, 1973–2005: Implications for women's legal status and public health. *Journal of Health Politics, Policy and Law, 38*(2), 299–343. https://doi.org/10.1215/03616878-1966324

142 World Health Organization, United Nations General Assembly. (1993). *Declaration on the elimination of violence against women*. World Health Organization.

143 United Nations Entity for Gender Equality and the Empowerment of Women (UN Women). (2023). Frequently asked questions: Types of violence against women and girls. https://www.unwomen.org/en/what-we-do/ending-violence-against-women/faqs/types-of-violence

144 Guo, C., Wan, M., Wang, Y., Wang, P., Tousey-Pfarrer, M., Liu, H., Yu, L., Jian, L., Zhang, M., Yang, Z., Ge, F., & Zhang, J. (2023). Associations between intimate partner violence and adverse birth outcomes during pregnancy: A systematic review and meta-analysis. *Frontiers in Medicine, 10*, Article 1140787. https://doi.org/10.3389/fmed.2023.1140787

145 Pastor-Moreno, G., Ruiz-Pérez, I., Henares-Montiel, J., & Petrova, D. (2020). Intimate partner violence during pregnancy and risk of fetal and neonatal death: A meta-analysis with socioeconomic context indicators. *American Journal of Obstetrics and Gynecology, 222*(2), 123–133, e5. https://doi.org/10.1016/j.ajog.2019.07.045

146 Pallatino, C., Chang, J. S., & Krans, E. E. (2021). The intersection of intimate partner violence and substance use among women with opioid use disorder. *Substance Abuse, 42*(2), 197–204. https://doi.org/10.1080/08897077.2019.1671296

147 White, S. J., Sin, J., Sweeney, A., Salisbury, T., Wahlich, C., Montesinos Guevara, C. M., Gillard, S., Brett, E., Allwright, L., Iqbal, N., Khan, A., Perot, C., Marks, J., & Mantovani, N. (2024). Global prevalence and mental health outcomes of intimate partner violence among women: A systematic review and meta-analysis. *Trauma, Violence & Abuse, 25*(1), 494–511. https://doi.org/10.1177/15248380231155529

148 Stubbs, A., & Szoeke, C. (2022). The effect of intimate partner violence on the physical health and health-related behaviors of women: A systematic review of the literature. *Trauma, Violence, & Abuse, 23*(4), 1157–1172. https://doi.org/10.1177/1524838020985541

149 Basile, K. C., Smith, S. G., Kresnow, M-J, Khatiwada, S., & Leemis, R. W. (2022). *The National Intimate Partner and Sexual Violence Survey: 2016/2017 report on sexual violence*. https://www.cdc.gov/violenceprevention/pdf/nisvs/nisvsreportonsexualviolence.pdf

150 Centers for Disease Control and Prevention. (2022). *Fast facts: Preventing intimate partner violence*. https://www.cdc.gov/violenceprevention/intimatepartnerviolence/fastfact.html

151 Rivara, F., Adhia, A., Lyons, V., Massey, A., Mills, B., Morgan, E., Simckes, M., & Rowhani-Rahbar, A. (2019). The effects of violence on health. *Health Affairs, 38*(10), 1622–1629. https://doi.org/10.1377/hlthaff.2019.00480

152 D'Angelo, D. V., Bombard, J. M., Lee, R. D., Kortsmit, K., Kapaya, M., & Fasula, A. (2022). Prevalence of experiencing physical, emotional, and sexual violence by a current intimate partner during pregnancy: Population-based estimates from the Pregnancy Risk Assessment Monitoring System. *Journal of Family Violence, 38*(1), 117–126. https://doi.org/10.1007/s10896-022-00356-y

153 Chan, E., Catabay, C. J., Campbell, J. C., Rudolph, A. E., Stockman, J. K., & Tsuyuki, K. (2021). Feminine gender norms and syndemic harmful drinking, sexual violence, and sexually transmitted infections among Black women at risk for HIV. *Drug and Alcohol Dependence, 221*, Article 108566. https://doi.org/10.1016/j.drugalcdep.2021.108566

154 Stockman, J.K., Hayashi, H., & Campbell, J. C. (2015). Intimate partner violence and its health impact on ethnic minority women. *Journal of Women's Health, 24*(1), 62–79. https://doi.org/10.1089/jwh.2014.4879

155 Cho, S., Crenshaw, K. W., & McCall, L. (2013). Toward a field of intersectionality studies: Theory, applications, and praxis. *Signs: Journal of Women in Culture and Society, 38*(4), 785–810. https://doi.org/10.1086/669608

156 Crenshaw, K. W. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review, 43*(6), Article 1241. https://doi.org/10.2307/1229039

National Institutes of Health
Office of Research on Women's Health